EURL-PROFICIENCY TEST-FV-18, 2016

Pesticide Residues in Spinach Homogenate

Final Report
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EURL-EUROPEAN UNION PROFICIENCY TEST 18
FOR THE DETERMINATION OF PESTICIDES IN FRUIT AND VEGETABLES USING MULTIRESIDUE METHODS
2016

According to Article 28 of Regulation 396/2005/EC (23rd February, 2005) of the European Parliament and of the Council, concerning maximum residue levels for pesticides in or on food and feed of plant and animal origin[1], all laboratories analysing samples for the official control of pesticide residues shall participate in the European Union Proficiency Tests (EUPTs) for pesticide residues organised by the European Union. These proficiency tests are carried out on an annual basis in order to continuously improve the quality, accuracy and comparability of the residue data reported by EU Member States to the European Union, as well as by other Member States, within the framework of the EU multi-annual coordinated control programme and national monitoring programmes.

Regulation (EC) No 882/2004[2] lays down the general tasks, duties and requirements for European Union Reference Laboratories (EURLs)[3] for Food, Feed and Animal Health. Among these tasks is the provision for independently-organised comparative tests. European Proficiency Test 18 has been organised by the EURL in Fruit and Vegetables at the University of Almería, Spain[4].

Participation in European Proficiency Test 18 was mandatory for all National Reference Laboratories (NRLs), as well as all other EU official laboratories, involved in the determination of pesticide residues in fruit and vegetables for the EU multi-annual coordinated control programme or for their own national monitoring programmes. Additionally, laboratories from China, Colombia, Costa Rica, Egypt, India, Indonesia, Israel, Kenya, Panama, Serbia, Thailand and Turkey participated in this test.

DG-SANTE will have full access to all data from the EUPTs including the lab-code/lab-name key. The NRLs will also have that information for the OfLs within their network. This report may be presented to the European Union Standing Committee on Plants, Animals, Food and Feed (PAFF).

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[1] Regulation (EC) No 396/2005, published in the OJ of the EU L70 on 16.03.2005, last amended by Regulation 839/2008 published in the OJ of the EU L234 on 30.08.2008.

[2] Regulation (EC) No 882/2004 of the European Parliament and of the Council on official controls performed to ensure compliance verification with feed and food law, animal health and animal welfare rules. Published in the OJ of the EU L191 on 28.05.2004.

[3] The Community Reference Laboratory (CRL) changed its name to the European Union Reference Laboratory (EURL) on 1st December 2009 as a result of the Treaty of Lisbon. OJ of the EU C306 on 17.12.2007.

[4] Commission Regulation (EC) No 776/2006 of 23rd May 2006 - amending Annex VII to Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards European Union Reference Laboratories.

1. INTRODUCTION

One hundred and ninety-one laboratories agreed to participate in European Union Proficiency Test 18.

The proficiency test was performed in 2016 using a spinach homogenate. The spinach plants were organically cultivated by the organisers in a greenhouse in Almería, Spain, and were treated before harvest using commercial formulations applied by spraying with conventional diffusors. Thirteen mandatory pesticides and two voluntary ones were used for the treatment, although finally only twelve mandatory and two voluntary[5] compounds were evaluated. Participating laboratories were also provided with a 'blank' spinach homogenate as well as the treated spinach test item.

The test items, 200 g of spinach homogenate containing pesticide residues, together with 200 g of 'blank' spinach homogenate, were shipped to participants on 8th February 2016. The deadline for results submission to the Organiser was 1st March 2016. The participants were asked to determine the residue levels of all the pesticides that they detected and to report the concentrations in mg/kg. The participants were provided with two target pesticide lists, one with pesticides that had to be analysed on a compulsory basis, and a second one with pesticides to be analysed voluntarily[5]. The compulsory list contained 190 target pesticides. However, during the blank analysis by the Organiser, spiromesifen was detected above the Minimum Required Reporting Level (MRRL), and due to the impossibility to grow more blank material, the Quality Control Group (QCG) decided to remove that pesticide from the target list. The new target list was uploaded to the webpage and the participants were informed about that. The final pesticide target list is detailed in Annex 1 together with the voluntary target list. This list of target pesticides also contained the MRRL for each pesticide fixed at 0.01 mg/kg, except for the following pesticides which have lower MRRLs based on Regulation (EU) No. 396/2005 and EU Directive 2006/125/EC: cadusafos (0.006 mg/kg); dimethoate and omethoate (0.003 mg/kg); ethoprophos (0.008 mg/kg); fipronil (0.004 mg/kg) along with oxydemeton-methyl and demeton-S-methylsulfone (0.006 mg/kg).

Participants were asked to analyse the blank test item and report results for any of the pesticides they found which were included in the target list. This 'blank' material was intended to be used for recovery experiments with the pesticides detected in the treated test item and, if necessary, for the preparation of matrix-matched calibration standard solutions.

The robust mean values of the analytical data submitted were used to obtain the assigned (true) values for each of the pesticide residues present. A fit-for-purpose relative target standard deviation (FFP RSD) of 25 % was chosen to calculate the target standard deviations (σ) as well as the z scores for the individual pesticides.

[5] The voluntary pesticides are not covered by the ISO/IEC 17043

For the assessment of overall laboratory performance, the Average of the squared z scores (AZ^2) has been used. Laboratories that had 'sufficient scope' and were able to analyse at least 90 % of the compulsory pesticides in the target pesticides list, had correctly detected and quantified a sufficiently high percentage of the pesticides present in the Test Item (at least 90 %) and reported no false positives were classified into Category A. Within this category, the laboratories were also subclassified as 'good', 'satisfactory' or 'unsatisfactory', in relation to the overall accuracy of the results that they reported.

All the other laboratories were classified into Category B, because they demonstrated 'insufficient scope'. For laboratories in Category B, individual z scores were calculated but the overall accuracy of their results was not assessed. They have been listed in order of the number of pesticides detected (of those used for the statistical evaluation) and the number of acceptable z scores achieved.

Laboratories that did not report results have not been classified into any category and are listed in Annex 2 with the remainder of laboratories that participated in EUPT-FV-18.

2. TEST ITEMS

2.1 Preparation of the treated test item

The spinach plants were organically cultivated by the organisers in a greenhouse in Almería, Spain, and were treated before harvest using commercial formulations applied by spraying with conventional diffusors.

Before preparation of the test item, the pesticides and target residue levels were selected, following recommendations made by the QCG, which had been appointed specifically for Proficiency Test 18. Approximately 240 m^2 of spinach plants were treated. All the pesticides were used as commercial pesticide formulations dissolved in water. Between three and eleven days after the application, a representative sample of the treated spinach was collected and analysed to check if the residue levels present were close to the target levels or whether any additional spraying was necessary. When the residue levels in the spinach were close to those recommended by the QCG, the entire production (120 kg) was harvested, frozen and processed using liquid nitrogen and a mincer. The frozen minced spinach was mixed in a constantly-spinning container until a homogeneous material was obtained. 200 g portions of the well-mixed homogenate were weighed out into screw-capped polyethylene plastic bottles, sealed and stored in a freezer at about - 20 °C prior to distribution to participants.

2.2 Preparation of 'blank' test item

The spinach plants used for the production of the blank test item were organically grown in the same greenhouse as the test item. Before the treatment of the spinach plants, 100 kg were harvested in order to be used in the preparation of the blank test items. A homogenate was prepared in the same way as the treated test item described previously.

2.3 Homogeneity test

The homogeneity and stability tests were subcontracted to the laboratory Eurofins SICA AgriQ S.L., which is accredited under ISO/IEC 17025 by the Spanish accreditation body (ENAC). Ten bottles of the treated test item were randomly chosen from those stored in the freezer and analyses were performed on duplicate portions taken from each bottle. The sequence of analyses was determined using a table of randomly-generated numbers. The injection sequence of the 20 extracts that were analysed by GC and LC was also randomly chosen. The quantification by GC-MS/MS and LC-MS/MS was performed using calibration curves constructed from matrix-matched standards prepared from the 'blank' spinach test item.

The statistical evaluation was performed according to the International Harmonized Protocol published by IUPAC, ISO and AOAC [1]. The individual residues data from the homogeneity tests are given in Appendix 1. The results of the statistical analyses are given in Table 2.1. The acceptance criteria for the test item to be sufficiently homogenous for the proficiency test were that: $Ss^2 < c$, where Ss is the between-bottle sampling standard deviation and $c = F_1\sigma^2_{all} + F_2S^2_{an}$; F_1 and F_2 being constant values of 1.88 and 1.01, respectively, from the ten samples taken, and σ^2_{all} = 0.3 x FFP RSD(25 %) x the analytical sampling mean for all the pesticides. This was used to demonstrate that the between-bottle variance was not higher than the within-bottle variance.

Table 2.1 Statistical evaluation of the homogeneity test data (n = 20 analyses)

Pesticide	Mean Conc. (mg/Kg)	Ss^2	c	$Ss^2 < c$ Pass/Fail
Chlorantraniliprole	3.480	0.050	0.132	Pass
Difenoconazole	0.901	0.002	0.009	Pass
Diflubenzuron	1.360	0.005	0.021	Pass
Dimethoate	0.037	0.000	0.000	Pass
Famoxadone	0.928	0.002	0.009	Pass
Fluopyram	0.284	0.001	0.001	Pass
Imidacloprid	0.258	0.000	0.001	Pass
Indoxacarb (sum of indoxacarb and its R enantiomer)	1.440	0.006	0.023	Pass
Metalaxyl and metalaxyl-M	0.069	0.000	0.000	Pass
Omethoate	0.148	0.000	0.000	Pass
Thiacloprid	0.574	0.001	0.004	Pass
Triadimenol	0.165	0.000	0.000	Pass
Voluntary Pesticides				
Cyazofamid	0.258	0.000	0.001	Pass
Fenpyrazamine	0.382	0.000	0.002	Pass

S_s: Between-Sampling Standard Deviation
The voluntary pesticides are not covered by the ISO/IEC 17043

As can be seen from Table 2.1, all the pesticides evaluated in the spinach matrix passed the homogeneity test. Two more pesticides were present in the test item, but they are not shown in the homogeneity table (nor in the stability one) as they were not considered for the evaluation of the laboratories (see section 4.1)

2.4 Stability tests

The stability tests were also subcontracted to the laboratory Eurofins SICA AgriQ S.L., which is accredited under ISO/IEC 17025 by the Spanish accreditation body (ENAC). The tests were performed according to ISO 13528:2015, Annex B [2]. Three bottles that were stored in the freezer at -20°C were chosen randomly and duplicate analyses were performed for each one of them. This procedure was repeated on two different occasions:

-Day 1: shortly before the test item shipment, which took place on February 8th 2016.
-Day 2: shortly after the deadline for reporting results, on May 1st 2016.

A pesticide was considered to be adequately stable if $|x_1 - y_i| \leq 0.3 \times \sigma$, where x_1 is the mean value of the first stability test, yi the mean value of the last stability test and σ the standard deviation used for proficiency assessment (typically 25 % of the assigned value).

The individual results are given in Table 2.2. The tests did not show any significant decrease in the pesticide concentrations with time. This demonstrates that, for the duration of the proficiency test and provided that the storage conditions prescribed were followed, the time elapsed until the participants performed the analysis would not have influenced their results.

Moreover, regarding the stability of the sample arriving not completely frozen, a duplicate analysis of a bottle reproducing the delivery conditions that the samples experienced during 48 hours was performed. Laboratories could therefore be sufficiently confident in accepting the treated test item even if it was not completely frozen. Results for this 48 hours stability test are indicated in Table 2.3.

Table 2.2 Statistical test for analytical precision and to demonstrate results stability after a time-elapse interval

	Day 1							Day 3								
(mg/Kg)	Sample 163_A	Sample 163_B	Sample 147_A	Sample 147_B	Sample 265_A	Sample 265_B	Mean 1	Sample 067_A	Sample 067_B	Sample 260_A	Sample 260_B	Sample 003_A	Sample 003_B	Mean3	(M3 – M1)	M3-M1 ≤ 0.3*σ
Chlorantraniliprole	3.200	3.200	3.400	3.400	3.300	3.300	3.300	3.200	3.200	3.100	3.100	3.300	3.200	3.183	-0.117	Pass
Difenoconazole	0.860	0.830	0.850	0.820	0.830	0.820	0.835	0.790	0.800	0.810	0.800	0.800	0.810	0.802	-0.033	Pass
Diflubenzuron	1.400	1.400	1.300	1.300	1.300	1.400	1.350	1.300	1.300	1.300	1.300	1.300	1.300	1.300	-0.050	Pass
Dimethoate	0.036	0.035	0.035	0.036	0.033	0.035	0.035	0.034	0.034	0.034	0.035	0.034	0.036	0.035	-0.001	Pass
Famoxadone	0.960	0.950	0.940	0.940	0.950	0.930	0.945	0.940	0.920	0.950	0.940	0.960	0.960	0.945	0.000	Pass
Fluopyram	0.270	0.240	0.240	0.230	0.220	0.220	0.237	0.220	0.230	0.270	0.250	0.260	0.270	0.250	0.013	Pass
Imidacloprid	0.230	0.230	0.230	0.240	0.220	0.240	0.232	0.220	0.220	0.220	0.220	0.220	0.220	0.220	-0.012	Pass

	Day 1							Day 3								
(mg/Kg)	Sample 163_A	Sample 163_B	Sample 147_A	Sample 147_B	Sample 265_A	Sample 265_B	Mean 1	Sample 067_A	Sample 067_B	Sample 260_A	Sample 260_B	Sample 003_A	Sample 003_B	Mean3	(M3 – M1)	M3-M1 ≤ 0.3*σ
Indoxacarb	1.300	1.400	1.400	1.300	1.300	1.300	1.333	1.200	1.200	1.300	1.300	1.300	1.400	1.283	-0.050	Pass
Metalaxyl and metalaxyl-M	0.058	0.065	0.059	0.059	0.062	0.049	0.059	0.056	0.057	0.055	0.058	0.055	0.056	0.056	-0.002	Pass
Omethoate	0.160	0.160	0.160	0.170	0.160	0.170	0.163	0.150	0.150	0.150	0.170	0.160	0.160	0.157	-0.007	Pass
Thiacloprid	0.570	0.570	0.570	0.600	0.580	0.580	0.578	0.540	0.530	0.550	0.550	0.560	0.560	0.548	-0.030	Pass
Triadimenol	0.170	0.180	0.170	0.180	0.170	0.180	0.175	0.170	0.170	0.170	0.170	0.170	0.180	0.172	-0.003	Pass
Voluntary Pesticides																
Cyazofamid	0.240	0.240	0.240	0.250	0.230	0.250	0.242	0.220	0.230	0.220	0.230	0.230	0.250	0.230	-0.012	Pass
Fenpyrazamine	0.350	0.350	0.330	0.340	0.330	0.330	0.338	0.310	0.310	0.310	0.310	0.320	0.320	0.313	-0.025	Pass

The voluntary pesticides are not covered by the ISO/IEC 17043

Table 2.3 Statistical test for analytical precision and to demonstrate stability for the 48-hour time-elapse interval.

	Day 1							Day 2								
(mg/Kg)	Sample 163_A	Sample 163_B	Sample 147_A	Sample 147_B	Sample 265_A	Sample 265_B	Mean 1	Sample 082_A	Sample 082_B	Sample 184_A	Sample 184_B	Sample 258_A	Sample 258_B	Mean2	(M2 – M1)	M2-M1 ≤ 0.3*σ
Chlorantraniliprole	3.200	3.200	3.400	3.400	3.300	3.300	3.300	3.000	3.000	3.400	3.200	3.100	3.000	3.117	-0.183	Pass
Difenoconazole	0.860	0.830	0.850	0.820	0.830	0.820	0.835	0.820	0.840	0.850	0.840	0.840	0.850	0.840	0.005	Pass
Diflubenzuron	1.400	1.400	1.300	1.300	1.300	1.400	1.350	1.300	1.300	1.300	1.300	1.300	1.300	1.300	-0.050	Pass
Dimethoate	0.036	0.035	0.035	0.036	0.033	0.035	0.035	0.036	0.038	0.037	0.037	0.037	0.039	0.037	0.002	Pass
Famoxadone	0.960	0.950	0.940	0.940	0.950	0.930	0.945	0.950	0.960	1.000	1.000	1.100	1.100	1.018	0.073	Pass
Fluopyram	0.270	0.240	0.240	0.230	0.220	0.220	0.237	0.230	0.230	0.250	0.260	0.250	0.250	0.245	0.008	Pass
Imidacloprid	0.230	0.230	0.230	0.240	0.220	0.240	0.232	0.230	0.240	0.230	0.240	0.230	0.240	0.235	0.003	Pass
Indoxacarb	1.300	1.400	1.400	1.300	1.300	1.300	1.333	1.300	1.400	1.400	1.400	1.400	1.400	1.383	0.050	Pass
Metalaxyl and metalaxyl-M	0.058	0.065	0.059	0.059	0.062	0.049	0.059	0.054	0.058	0.059	0.057	0.052	0.055	0.056	-0.003	Pass
Omethoate	0.160	0.160	0.160	0.170	0.160	0.170	0.163	0.170	0.180	0.160	0.170	0.160	0.180	0.170	0.007	Pass
Thiacloprid	0.570	0.570	0.570	0.600	0.580	0.580	0.578	0.570	0.580	0.600	0.600	0.610	0.620	0.597	0.018	Pass
Triadimenol	0.170	0.180	0.170	0.180	0.170	0.180	0.175	0.180	0.190	0.180	0.190	0.190	0.190	0.187	0.012	Pass
Voluntary Pesticides																
Cyazofamid	0.240	0.240	0.240	0.250	0.230	0.250	0.242	0.230	0.240	0.240	0.240	0.230	0.250	0.238	-0.003	Pass
Fenpyrazamine	0.350	0.350	0.330	0.340	0.330	0.330	0.338	0.330	0.350	0.350	0.350	0.360	0.370	0.352	0.013	Pass

The voluntary pesticides are not covered by the ISO/IEC 17043

2.5 Distribution of test items and protocol to participants

One bottle of frozen treated test item and one bottle of frozen 'blank' material were shipped to each participant in boxes containing dry ice. The test items were sent out on 8th February 2016. Ninety-nine percent of the shipments to EU/EFTA countries arrived within the first 48 hours.

Before sample shipment, the laboratories received full instructions (Annex 1) for the receipt and storage of the test items and they were encouraged to use their normal sample receipt

procedure and method(s) of analysis. These instructions were uploaded onto the open site of the EURL-FV webpage as part of the Specific Protocol. The Application Form was also available as an on-line form. When applying to participate in the test, each laboratory decided on their own password, which was required in order to enter the restricted zone where Forms 0-5 could be accessed on-line. This information was made available when laboratories received an e-mail from the Organiser confirming their acceptance along with their Lab Code and thus allowing them to participate. This ensured that confidentiality was maintained throughout the duration of Proficiency Test 18. The Target Pesticide List and the Minimum Required Reporting Levels (MRRLs), as established by the Organiser, were uploaded onto the EURL-FV open website at least three months before the shipment of the test item to allow laboratories sufficient time to purchase standards and to validate their methods.

3. STATISTICAL METHODS

3.1 False positives and negatives

3.1.1 False positives

These are results of pesticides from the Target Pesticides List, that are reported at, or above, their respective MRRLs although they were: (i) not detected by the Organiser, even after repeated analyses, and/or (ii) not detected by the overwhelming majority (e.g. > 95 %) of the participating laboratories that had targeted the specific pesticides. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.

Any results reported lower than the MRRL will not be considered as false positives, even though these results should not have been reported.

No z score values have been calculated for false positive results. Any laboratory reporting a false positive, even when reporting the necessary number of pesticides to obtain sufficient scope, has been classified into Category B.

3.1.2 False negatives

These are results for pesticides reported by the laboratories as 'analysed' but without reporting numerical values although they were: a) used by the Organiser to treat the Test Item and b) detected by the Organiser as well as the majority of the participants that had targeted these specific pesticides at or above the respective MRRLs. Results reported as '< RL' (RL= Reporting Limit of the laboratory) will be considered as not detected and will be judged as false negatives. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.

In cases of the assigned value being less than a factor of 4 times the MRRL, false negatives will typically not be assigned. The EUPT-Panel may decide to take case-by-case decisions in this respect after considering all relevant factors such as the result distribution and the reporting limits of the affected labs. z scores have been calculated for all evaluated pesticides that were

detected and reported at levels at, or above, the MRRL. They have also been calculated for false negatives. However, these z scores were not taken into account in assessing the 90 %, or more, of pesticides present in the sample needed to be classified into Category A.

3.2 Estimation of the assigned values (x_{pt})

In order to minimise the influence of out-lying results on the statistical evaluation, the assigned value (= consensus concentration) was estimated using robust statistics as described in ISO 13528:2015, taking into account the results reported by EU and EFTA countries laboratories only. Individual results without any numerical values reported, such as detected (D), were not considered. The spread of results for each pesticide was tested for multimodality. In special justifiable cases, the EUPT-Panel may decide to eliminate certain results traceably associated with gross errors or to use only the results of a subgroup consisting of laboratories that have repeatedly demonstrated good performance for the specific compound in the past.

Taking into account the normative for robust analysis in ISO 13528:2015, the uncertainty was accompanying the assigned value for each pesticide was calculated according to the following equation:

$$u(x_{pt}) = 1.25\frac{s^*}{\sqrt{\mathrm{p}}}$$

Where:

- u (x_{pt}) is the uncertainty in mg/Kg.
- s* is the robust standard deviation of the results.
- p is the total number of results.

3.3 Fixed target standard deviations

Based on the experience gained from previous EU proficiency tests and recommendations from the EURL Advisory Group, a fixed relative standard deviation (FFP-RSD) of 25 % was chosen [3]. This is in line with the internationally-accepted target Measurement Uncertainty of 50 % for multiresidue analysis of pesticides [4], which is derived from, and linked to, the EUPTs. The same target RSD has been applied to all the pesticides, independent of concentration. For informative purposes the robust relative standard deviation (CVs*) is calculated according to ISO 13528:2015; Chapter 7.7 (Consensus value from participant results) following Algorithm A in Annex C, and it can be compared to the FFP-RSD in Table 4.4.

3.4 z scores

A z score for each laboratory/pesticide combination was calculated according to the following equation:

$$z_i = \frac{(x_i - x_{pt})}{\sigma_{\mathrm{pt}}}$$

Where:

- x_i is the result reported by the participant, or the MRRL or the reporting level (RL) (whichever one is lower) for those labs that have not detected the presence of the pesticide in the sample.
- X_{pt} is the assigned value.
- σ_{pt} is the target standard deviation (the FFP-RSD of 25 % multiplied by the assigned value).

z score classification is as follows:

$\|z\| \leq 2.0$	Acceptable
$2.0 < \|z\| < 3.0$	Questionable
$\|z\| \geq 3.0$	Unacceptable

- Any z score values of $|z| > 5$ have been reported as '>5' and a value of '5' has been used to calculate combined z scores.
- No z score calculations have been performed for false positive results.
- For false negative results, the MRRL (or RL) has been used to calculate the z score. These z scores have also been included in the graphical representation, and are marked with an asterisk.

3.5 Combined z scores

In order to evaluate each laboratory's overall performance according to the quality of its results and its scope, two classifications - Category A and B - were used. To be classified into Category A, laboratories had to be able to analyse at least 90 % of the compulsory pesticides in the target pesticides list, to correctly identify and report quantitative results (that is *sought and detected*) for 90 % or more of the total number of pesticides present in the test item and report no false positives (for the 90 % criterion the number of pesticides needed to be correctly analysed to have sufficient scope will be calculated by multiplying the number of compulsory pesticides from the Target Pesticides List by 0.9 and rounded to the nearest full number with 0.5 decimals being rounded downwards). If these three requirements were met, then the combined z scores were calculated as the 'Average of the Squared z scores' (AZ^2) [5].

3.5.1 The Average of the Squared z scores (AZ^2)

The 'Average of the Squared z scores' was introduced for the first time in EUPT-FV-12. The AZ^2 is calculated as follows:

$$AZ^2 = \frac{\sum_{i=1}^{n} Z_i^2}{n}$$

The resultant formula is the sum of the z scores value, multiplied by itself and divided by the number of z scores (n) detected by each laboratory, including those from false negatives.

This formula is subsequently used to produce an overall classification of laboratories with three sub-classifications: 'good', 'satisfactory' and 'unsatisfactory'.

$$|AZ^2| \leq 2.0 \quad \text{Good}$$
$$2.0 < |AZ^2| < 3.0 \quad \text{Satisfactory}$$
$$|AZ^2| \geq 3.0 \quad \text{Unsatisfactory}$$

In this way, a simple, single, combined value is also achieved, as with the previous formula. However, this time, it is more mathematically justifiable as it uses the actual z score value rather than the factors 1, 3 and 5. Again, the aim is to encourage laboratories to not only improve the accuracy of their results but also to analyse a greater number of pesticides.

Laboratories that did not detect and quantify sufficient pesticides, that were not able to analyse at least 90 % of the compulsory pesticides or reported a false positive, have been placed in Category B and no combined z score has been calculated.
In Appendices 5 and 6, only results of laboratories in Category A have been presented, along with their graphical representations.

4. RESULTS

4.1 Summary of reported results

One hundred and ninety-one laboratories agreed to participate in this proficiency test. Two cancelled their participation and two did not submit results. The total number of laboratories submitting results was 187. The results reported by all the laboratories are presented in this report. However, only results reported by laboratories from EU-countries and EFTA-countries (Iceland, Norway, and Switzerland) have been included in the statistical treatment. The results from the laboratories in China, Colombia, Costa Rica, Egypt, India, Indonesia, Israel, Kenya, Panama, Serbia, Thailand and Turkey have not been included. This last group totals 16 laboratories that reported results.

Thirteen pesticides from the compulsory pesticide target list and two voluntary pesticides[6] were used to treat the sample. An additional compound, omethoate, originated as a metabolite of dimethoate. The assigned values of two of the compulsory pesticides, cymoxanil and penconazole, were lower than a factor of four times the MRRL (0.011 and 0.016 mg/kg, respectively), and therefore, the Scientific Committee considered that they should not be evaluated. Finally, twelve compulsory and two voluntary pesticides were used for the evaluation of the participants. A summary of the reported results for the pesticides evaluated can be seen below in Table 4.1.

[6] The voluntary pesticides are not covered by the ISO/IEC 17043

Table 4.1 Summary of Reported Results

Pesticides	No. of Reported Results	No. of False Negative Results	No. of Not Analysed Results	Percentage of Reported Results* (out of 171)
Chlorantraniliprole	118	2	51	69
Difenoconazole	155	2	14	91
Diflubenzuron	118	2	51	69
Dimethoate	162	3	6	95
Famoxadone	122	5	44	71
Fluopyram	111	3	57	65
Imidacloprid	146	1	24	85
Indoxacarb (sum of indoxacarb and its R enantiomer)	145	3	23	85
Metalaxyl and metalaxyl-M	156	3	12	91
Omethoate	147	3	21	86
Thiacloprid	144	1	26	84
Triadimenol	149	6	16	87
Voluntary Pesticides				
Cyazofamid	89	3	79	52
Fenpyrazamine	39	1	131	23

* The percentage of Reported Results comes from 171 laboratories. It does not take into account the sixteen laboratories from China, Colombia, Costa Rica, Egypt, India, Indonesia, Israel, Kenya, Panama, Serbia, Thailand and Turkey.
The voluntary pesticides are not covered by the ISO/IEC 17043

The laboratories that agreed to participate are listed in Annex 2. All results reported by the participants are given in Appendix 3, whilst the analytical methods used are given in Appendix 7 (available in the EURL-FV web page in electronic format).

4.1.1 False positives

Eleven laboratories (including non-EU countries) reported results for additional pesticides that were not present in the test item. These pesticides and the residue levels reported are presented in Table 4.2 together with the MRRLs and reporting levels (RLs). Where the reported concentrations of the erroneously-detected pesticide were higher than the assigned MRRL value in the Target Pesticide List (Annex 1), the result has been considered as a false positive. If the concentrations reported were below the MRRLs, or if the pesticides did not appear in the pesticide list included in Annex 1, then they were not considered to be false positives.

Four out of those eleven laboratories reporting a false positive result have not been classified into Category A despite achieving sufficient scope. One additional laboratory would have been classified into category A if it had not reported a false positive result and if it would have been able to analyse more than 90 % of the pesticides of the mandatory target list.

Table 4.2 Laboratories that reported as quantitative results for pesticides that were not present in the treated test item

Laboratory Code	Pesticide	Concentration (mg/kg)	Determination Technique	RL (mg/kg)	MRRL (mg/kg)
Lab031	Diphenylamine	0.01	GC-MS/MS	0.01	0.01
Lab031	Flutolanil	0.05	GC-MS/MS	0.01	0.01
Lab034	Triadimefon	0.21	GC-MS/MS	0.05	0.01
Lab042	Orthophenylphenol	0.126	GC-MS	0.01	0.01
Lab047	Flutolanil	0.035	GC-MS	0.02	0.01
Lab070	Dicofol (sum of p, p' and o,p' isomers)	0.013	GC-MS/MS	0.01	0.01
Lab077	Flutolanil	0.161	GC-MS/MS	0.01	0.01
Lab083	Demeton-S-methylsulfone	0.043	LC-MS/MS	0.025	0.006
Lab106*	Triticonazole	0.016	LC-MS/MS	0.01	0.01
Lab162	Flutolanil	0.107	GC-MS/MS	0.01	0.01
Lab164	Chlorpropham	0.513	GC-MS/MS	0.01	0.01
Lab177	Endosulfan alpha	0.01	GC-ECD	0.01	0.01
Lab177	Endosulfan sulfate	0.04	No information	0.01	0.01

*Non-EU/EFTA laboratories

4.1.2 False negatives

Table 4.3 summarises the results from laboratories (including non-EU laboratories) that reported false negatives presented as 'Not Detected' (ND).

Table 4.3 Laboratories that failed to report pesticides that were present in the treated test item.

Laboratory Code	Chlorantraniliprole	Difenoconazole	Diflubenzuron	Dimethoate	Famoxadone	Fluopyram	Imidacloprid	Indoxacarb (sum of indoxacarb and its R enantiomer)	Metalaxyl and metalaxyl-M	Omethoate	Thiacloprid	Triadimenol
Lab004				ND								
Lab027					ND							ND
Lab030								ND				
Lab034												ND
Lab050					ND							ND
Lab067	ND	ND	ND		ND				ND			ND
Lab074			ND									
Lab091	ND											
Lab091	ND											
Lab102*			ND									
Lab103*					ND							
Lab106*	ND											
Lab112*				ND				ND	ND			
Lab128						ND						
Lab131		ND						ND				
Lab140				ND				ND				
Lab141				ND	ND				ND	ND		ND
Lab158					ND							
Lab165												ND
Lab168										ND		
Lab172									ND			

Laboratory Code	Chlorantraniliprole	Difenoconazole	Diflubenzuron	Dimethoate	Famoxadone	Fluopyram	Imidacloprid	Indoxacarb (sum of indoxacarb and its R enantiomer)	Metalaxyl and metalaxyl-M	Omethoate	Thiacloprid	Triadimenol
Lab173						ND						
Lab187						ND						
Lab188							ND				ND	
Lab191										ND		
Voluntary Pesticides												
	Cyazofamid						**Fenpyrazamine**					
Lab017	ND											
Lab067	ND											
Lab102	ND											
Lab106	ND											
Lab151	ND						ND					

*Non-EU/EFTA laboratories
The voluntary pesticides are not covered by the ISO/IEC 17043

4.1.3 Distribution of data

The distribution of the concentrations of the pesticides reported by the laboratories has been plotted as histograms with a bandwidth of $0.75 \cdot \sigma$ (σ is the target standard deviation (the FFP-RSD of 25 % multiplied by the assigned value) after removing outliers, if necessary. The histograms of both the compulsory and voluntary pesticides present in the test item are presented in Appendix 2.

4.2 Assigned values and target standard deviations

The assigned values are based on the robust mean values calculated using all the results reported by laboratories from EU and EFTA countries. The assigned values for the twelve compulsory and the two voluntary pesticides and their uncertainties are presented in Table 4.4.

The target standard deviation was calculated using a fixed FFP-RSD value of 25 %. For comparison, a robust standard deviation (CV*) was also calculated for informative purposes, employing also this value for the calculation of the uncertainty. These RSDs can be seen in Table 4.4.

Table 4.4 Robust mean values, uncertainty and % RSDs for all pesticides evaluated.

Pesticides	MRRL (mg/kg)	Robust mean (mg/kg)	Uncertainty (mg/kg)	Number of results (n)	FFP-RSD (%)	CV* (%)
Chlorantraniliprole	0.01	3.071	0.065	118	25	18.4
Difenoconazole	0.01	0.837	0.015	155	25	17.5
Diflubenzuron	0.01	1.121	0.023	118	25	18.1
Dimethoate	0.003	0.036	0.001	162	25	17.1

Pesticides	MRRL (mg/kg)	Robust mean (mg/kg)	Uncertainty (mg/kg)	Number of results (n)	FFP-RSD (%)	CV* (%)
Dimethoate (sum of dimethoate and omethoate expressed as dimethoate)*	-	0.189	0.004	147	25	21.0
Famoxadone	0.01	1.026	0.018	122	25	15.3
Fluopyram	0.01	0.289	0.005	111	25	14.2
Imidacloprid	0.01	0.250	0.003	146	25	12.8
Indoxacarb (sum of indoxacarb and its R enantiomer)	0.01	1.436	0.028	145	25	19.1
Metalaxyl and metalaxyl-M	0.01	0.058	0.001	156	25	16.5
Omethoate	0.003	0.142	0.004	147	25	24.9
Thiacloprid	0.01	0.516	0.007	144	25	12.5
Triadimenol	0.01	0.205	0.003	149	25	16.6
Voluntary Pesticides						
Cyazofamid	0.01	0.279	0.008	89	25	22.0
Fenpyrazamine	0.01	0.357	0.011	39	25	14.8

The voluntary pesticides are not covered by the ISO/IEC 17043
*For informative purposes only

4.3 Assessment of laboratory performance

4.3.1 z scores

z scores were calculated using the FFP RSD of 25 % for all the pesticides evaluated.

In Appendix 3, the individual z scores are presented for each laboratory, together with the assigned values for each pesticide. The z scores of laboratories from non-EU countries have been included in Appendix 3 but have not been considered in the following table.

Table 4.5 Classification of z scores for the pesticides reported (only EU/EFTA participants)

Pesticides	Acceptable (%)	Questionable (%)	Unacceptable (%)
Chlorantraniliprole	93.3	1.7	5.0
Difenoconazole	95.5	1.3	3.2
Diflubenzuron	88.3	2.5	9.2
Dimethoate	95.2	3.0	1.8
Dimethoate (sum of dimethoate and omethoate expressed as dimethoate)*	92.5	5.4	2.0
Famoxadone	90.5	2.4	7.1
Fluopyram	93.9	3.5	2.6
Imidacloprid	95.2	4.1	0.7
Indoxacarb (sum of indoxacarb and its R enantiomer)	92.6	3.4	4.0
Metalaxyl and metalaxyl-M	93.7	1.3	5.0

Pesticides	Acceptable (%)	Questionable (%)	Unacceptable (%)
Omethoate	87.3	7.4	5.3
Thiacloprid	97.9	1.4	0.7
Triadimenol	92.9	1.9	5.2
Voluntary Pesticides			
Cyazofamid	88.0	0.0	12.0
Fenpyrazamine	95.0	2.5	2.5

The voluntary pesticides are not covered by the ISO/IEC 17043
*For informative purposes only

z scores for false negative results have been calculated using the MRRL value given in the Target Pesticide List (Annex 1) or the RL value from the laboratory (whichever was lower).

In Appendix 4, graphical representations of the z scores of EU/EFTA laboratories are presented. No z scores have been calculated for false positive results. z scores for false negative results have been included on the chart and are indicated by an asterisk. The charts have been constructed using different colour bars according to the determination technique used for each particular pesticide. For informative purposes, the z score graph for dimethoate residue definition (sum of dimethoate and omethoate expressed as dimethoate) has been included in Appendix 4.

4.3.2 Combined z scores

As previously mentioned in Section 3.5, the AZ^2 formula has only been applied to those participants categorised into Category A and considering only compulsory pesticides.

The table in Appendix 5 shows the values of individual z scores for each compulsory pesticide and the combined 'Average of the Squared z scores' (AZ^2) for all laboratories in Category A (including non-EU countries), which were those laboratories that were able to analyse at least 90 % of the compulsory pesticides in the target pesticides list (11), to detect and quantify at least 90 % of the pesticides present in the Test Item (171), and that do not report any false positive result. A graphical representation of those results for the EU/EFTA laboratories can be found in Appendix 6.

Ninety-eight of the 171 EU and EFTA laboratories that submitted results were classified into Category A (57 %).

From the AZ^2, 88 % were classed as 'good', 9 % as 'satisfactory' and 3 % as 'unsatisfactory'.

Of the 73 EU and EFTA laboratories in Category B, three would have been in Category A if they had not reported a false positive result.

Table 4.6 shows all the laboratories in Category A, the number of pesticides reported, the percentage of pesticides analysed from the compulsory target list, the AZ^2 values and their

subclassifications. Laboratories that reported false negative results in Category A are marked with an asterisk.

Table 4.7 shows all the laboratories in Category B, the number and percentage of results reported, the percentage of pesticides analysed from the compulsory target list and the number of acceptable z scores. Laboratories reporting a false negative are marked with an asterisk and laboratories reporting a false positive are marked with a '+'.

The AZ^2 graphical representation for EU/EFTA laboratories classified into Category A can be seen in Appendix 6. The National Reference Laboratories (NRLs) for Fruit and Vegetables have been plotted using a different colour.

Laboratory performance over the last three EUPTs using the AZ^2 formula has been summarized as follows:

- For EUPT-FV-18, out of 171 laboratories (EU and EFTA), 98 were in Category A with the following classes: 3 'unsatisfactory', 9 'satisfactory' and 86 'good'.
- For EUPT-FV-17, out of 165 laboratories (EU and EFTA), 113 were in Category A with the following classes: 15 'unsatisfactory', 8 'satisfactory' and 90 'good'.
- For EUPT-FV-16, out of 169 laboratories (EU and EFTA), 100 were in Category A with the following classes: 2 'unsatisfactory', 5 'satisfactory' and 93 'good'.
- For EUPT-FV-15, out of 160 laboratories (EU and EFTA), 87 were in Category A with the following classes: 1 'unsatisfactory', 6 'satisfactory' and 80 'good'.

Table 4.6 Performance and Classification of laboratories in Category A using the AZ^2 formula

Lab Code	No. of pesticides detected (max.12)	% of pesticides analysed from target list	AZ^2	Classification
Lab001	12	98	0.3	Good
Lab002	12	100	0.2	Good
Lab003	12	100	0.8	Good
Lab006	12	100	1.4	Good
Lab008	12	97	0.9	Good
Lab009	12	95	0.2	Good
Lab010	12	100	0.1	Good
Lab011	12	100	0.3	Good
Lab012	11	91	0.3	Good
Lab013	12	100	0.3	Good
Lab014	12	100	0.1	Good
Lab015	12	97	1.6	Good
Lab016	12	94	0.7	Good
Lab018	11	96	0.6	Good
Lab019	12	100	0.2	Good
Lab020	12	100	0.3	Good
Lab021	12	99	0.4	Good

Lab Code	No. of pesticides detected (max.12)	% of pesticides analysed from target list	AZ[2]	Classification
Lab022	12	91	0.5	Good
Lab023	12	100	0.2	Good
Lab024	12	99	0.8	Good
Lab025	12	100	0.1	Good
Lab026	12	99	0.4	Good
Lab028	12	100	0.8	Good
Lab029	12	98	1.3	Good
Lab032	11	91	2.7	Satisfactory
Lab035	12	100	0.1	Good
Lab037	12	100	0.1	Good
Lab039	12	100	0.2	Good
Lab040	12	100	1.3	Good
Lab041	12	100	0.2	Good
Lab044	12	96	0.0	Good
Lab045	12	97	0.2	Good
Lab046	12	100	0.2	Good
Lab049	12	97	0.2	Good
Lab051	12	98	4.9	Unsatisfactory
Lab052	12	98	0.2	Good
Lab053	12	100	0.1	Good
Lab054	12	100	0.4	Good
Lab055	12	99	0.6	Good
Lab057	12	100	2.8	Satisfactory
Lab060	12	100	0.6	Good
Lab061	12	100	0.3	Good
Lab062	12	95	0.4	Good
Lab063	12	99	0.2	Good
Lab066	12	98	0.6	Good
Lab068	12	100	0.2	Good
Lab069	12	95	0.6	Good
Lab072	12	100	0.1	Good
Lab074*	11	99	2.2	Satisfactory
Lab075	11	96	0.9	Good
Lab076	12	98	0.2	Good
Lab078	12	100	0.2	Good
Lab081	12	99	1.0	Good
Lab085	12	100	0.0	Good
Lab086	12	99	0.5	Good
Lab087	12	99	0.1	Good
Lab088	12	100	0.2	Good
Lab089	12	90	0.3	Good
Lab090	12	100	0.2	Good
Lab096	12	100	0.1	Good
Lab108	11	95	0.5	Good
Lab109	11	93	0.3	Good
Lab110	12	98	1.2	Good
Lab111	11	98	0.4	Good
Lab115	12	100	0.3	Good

Lab Code	No. of pesticides detected (max.12)	% of pesticides analysed from target list	AZ[2]	Classification
Lab117	12	100	0.1	Good
Lab118	12	100	0.6	Good
Lab123	12	99	0.6	Good
Lab124	12	96	0.5	Good
Lab125	12	99	0.5	Good
Lab126	12	100	0.6	Good
Lab127	12	97	1.2	Good
Lab128*	11	98	1.8	Good
Lab130	12	100	0.3	Good
Lab132	12	96	1.2	Good
Lab133	12	100	0.1	Good
Lab134	12	100	0.0	Good
Lab135	12	100	0.6	Good
Lab137	11	93	0.5	Good
Lab139	12	96	2.4	Satisfactory
Lab142	12	98	0.6	Good
Lab144	12	99	0.4	Good
Lab148	12	99	0.2	Good
Lab150	12	99	0.3	Good
Lab152	12	100	0.1	Good
Lab154	12	96	0.9	Good
Lab158*	11	95	5.1	Unsatisfactory
Lab160	12	99	0.2	Good
Lab161	12	100	2.3	Satisfactory
Lab167	11	99	1.0	Good
Lab168*	11	100	2.1	Satisfactory
Lab169	12	91	0.3	Good
Lab173*	11	100	2.1	Satisfactory
Lab175	11	95	4.7	Unsatisfactory
Lab178	12	97	2.4	Satisfactory
Lab181	12	98	0.2	Good
Lab182	12	94	0.7	Good
Lab183	11	92	0.3	Good
Lab185	12	97	0.1	Good
Lab186	12	100	1.8	Good
Lab187*	11	97	1.6	Good
Lab190	11	91	0.2	Good
Lab192	11	94	2.4	Satisfactory

* Laboratories reporting a false negative result.

Table 4.7 Performance of laboratories in Category B

Lab Code	% No. of pesticides detected / No. of pesticides evaluated (11)	No. of pesticides detected	% of pesticides analysed from target list	No. of total z scores	No. of acceptable z scores (z score ≤ 2)
Lab004*	33	4	38	5	4
Lab005	75	9	68	9	9
Lab007	83	10	91	10	10
Lab017	83	10	91	10	9
Lab027*	75	9	90	11	9
Lab030*	75	9	66	10	7
Lab031+	33	4	52	4	2
Lab033	92	11	62	11	9
Lab034*+	25	3	44	4	3
Lab036	75	9	81	9	9
Lab038	83	10	82	10	9
Lab042+	75	9	62	9	9
Lab043	67	8	73	8	8
Lab047+	58	7	62	7	7
Lab048	67	8	50	8	8
Lab050*	83	10	87	12	3
Lab058	8	1	22	1	1
Lab059	83	10	69	10	9
Lab064	8	1	27	1	1
Lab065	75	9	74	9	8
Lab067*	42	5	75	11	3
Lab070+	92	11	86	11	11
Lab071	8	1	17	1	1
Lab073	33	4	44	4	4
Lab077+	100	12	97	12	12
Lab079	42	5	41	5	5
Lab080	92	11	76	11	9
Lab082	67	8	64	8	8
Lab083+	100	12	99	12	12
Lab084	75	9	90	9	5
Lab091*	58	7	47	8	6
Lab092	42	5	58	5	5
Lab093	33	4	58	4	4
Lab094	83	10	91	10	10
Lab095	67	8	68	8	8
Lab097	100	12	72	12	12
Lab098	75	9	76	9	8
Lab099	42	5	51	5	5
Lab100	17	2	14	2	2
Lab101	83	10	72	10	10
Lab102*	58	7	84	8	6
Lab103*	75	9	81	10	9
Lab104	67	8	44	8	7
Lab105	33	4	37	4	4
Lab106*+	92	11	98	12	10
Lab107	83	10	91	10	10
Lab112*	25	3	42	6	1

Lab Code	% No. of pesticides detected / No. of pesticides evaluated (11)	No. of pesticides detected	% of pesticides analysed from target list	No. of total z scores	No. of acceptable z scores (z score ≤ 2)
Lab113*	33	4	35	6	3
Lab114	92	11	67	11	8
Lab119	75	9	89	9	7
Lab120	50	6	66	6	5
Lab121	0	0	14	0	0
Lab122	42	5	45	5	5
Lab131*	50	6	72	8	6
Lab136	0	0	33	0	0
Lab138	83	10	91	10	10
Lab140*	33	4	69	6	3
Lab141*	8	1	36	6	1
Lab145	58	7	75	7	6
Lab146	25	3	22	3	2
Lab147	67	8	64	8	8
Lab149	67	8	87	8	8
Lab151	42	5	19	5	5
Lab153	25	3	32	3	3
Lab155	92	11	72	11	11
Lab156	67	8	65	8	7
Lab157	83	10	91	10	8
Lab159	17	2	20	2	2
Lab162+	100	12	95	12	11
Lab163	33	4	89	4	3
Lab164+	67	8	77	8	8
Lab165*	83	10	78	11	8
Lab166	33	4	38	4	3
Lab170	83	10	79	10	8
Lab172*	42	5	37	6	5
Lab174	92	11	81	11	8
Lab176	75	9	74	9	8
Lab177+	0	0	3	0	0
Lab179	83	10	68	10	9
Lab180	67	8	84	8	8
Lab184	67	8	83	8	8
Lab188*	25	3	38	5	3
Lab189	50	6	57	6	6
Lab191*	83	10	64	11	10

* Laboratories reporting a false negative result.
+ Laboratories reporting a false positive result.
The voluntary pesticides are not covered by the ISO/IEC 17043

5. CONCLUSIONS

One hundred and ninety-one laboratories agreed to participate in EUPT-FV-18. Two cancelled their participation and two did not submit results for the analysis of the spinach homogenate test item. From the remaining 187 laboratories that submitted results, 16 did not belong to EU nor EFTA countries, so their results were not considered for the estimation of the assigned value.

Twelve mandatory and two voluntary pesticides were evaluated in EUPT-FV-18, based on the analysis of spinach homogenate.

Of a total number of 2052 possible determinations from EU/EFTA laboratories (171 laboratories by 12 evaluated pesticides), 81.5 % results were reported, 16.8 % were not analysed and 1.7 % were not detected (false negative results). The false positive rate was 0.6 %.

The total number of z scores of laboratories from EU/EFTA countries was 1707, with 93.2 % of them acceptable, 2.8 % questionable and 4.0 % unacceptable.

The residue definition for dimethoate is not fully covered by the EU/EFTA OfLs as the number of reported results for dimethoate and omethoate is not the same (Table 4.1)

57 % of the EU and EFTA laboratories that submitted results were classified into Category A. Of them, 88 % were classed as 'good', 9 % as 'satisfactory' and 3 % as 'unsatisfactory'.

The robust standard deviation (CV*) was in all cases below 25.0 %, with an average value of 16.9 % for the 12 pesticides evaluated, which highlights the improvement of the participant laboratories, as well as strengthens the use of the 25 % fit-for-purpose relative standard deviation (FFP-RSD) as well as the use of the internationally accepted 50 % target expanded measurement uncertainty for multiresidue analysis of pesticides.

Participation in this year's European Proficiency Test 18 involved at least one laboratory from each Member State. Additionally, laboratories from Iceland, Norway and Switzerland participated as EFTA countries. As laid down in Article 32 of Regulation (EC) N° 882/2004, one of the EURL's duties is to collaborate with non-EU laboratories that are responsible for analysing food and feed samples and to help them improve the quality of their analyses. Non-European laboratories from China, Colombia, Costa Rica, Egypt, India, Indonesia, Israel, Kenya, Panama, Serbia, Thailand and Turkey participated in EUPT-FV-18. These Non-EU laboratories, however, are official laboratories in their own countries.

6. REFERENCES

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The Organiser wishes to give a special thank-you to the University of Almeria for the use of their facilities.

Chlorantraniliprole (mg/kg)		Difenoconazole (mg/kg)		Diflubenzuron (mg/kg)		Dimethoate (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
3.6	3.6	0.91	0.92	1.4	1.4	0.035	0.036
3.3	3.4	0.85	0.85	1.3	1.3	0.034	0.038
3.4	3.5	0.89	0.90	1.3	1.3	0.037	0.039
3.4	3.3	0.90	0.91	1.4	1.4	0.032	0.034
3.0	3.1	0.84	0.86	1.3	1.2	0.035	0.036
3.6	3.7	0.89	0.88	1.3	1.4	0.035	0.035
3.4	3.5	0.86	0.86	1.3	1.3	0.033	0.035
3.3	3.4	0.92	0.93	1.4	1.4	0.037	0.039
3.7	3.7	0.94	0.92	1.4	1.4	0.038	0.042
3.8	3.9	0.98	1.0	1.5	1.5	0.039	0.041

Famoxadone (mg/kg)		Fluopyram (mg/kg)		Imidacloprid (mg/kg)		Indoxacarb (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.93	0.98	0.29	0.31	0.25	0.25	1.5	1.5
0.88	0.86	0.23	0.25	0.25	0.27	1.4	1.4
0.89	0.91	0.29	0.28	0.26	0.27	1.4	1.4
0.97	0.93	0.28	0.28	0.23	0.24	1.5	1.5
0.86	0.88	0.26	0.29	0.24	0.25	1.4	1.4
0.93	0.94	0.25	0.25	0.25	0.25	1.4	1.5
0.88	0.86	0.29	0.30	0.24	0.26	1.3	1.3
0.93	0.94	0.32	0.31	0.26	0.27	1.4	1.4
0.99	0.99	0.26	0.29	0.26	0.28	1.4	1.5
1.0	1.0	0.33	0.32	0.28	0.29	1.6	1.6

Metalaxyl and metalaxyl-M (mg/kg)		Omethoate (mg/kg)		Thiacloprid (mg/kg)		Triadimenol (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.071	0.070	0.14	0.15	0.56	0.55	0.15	0.16
0.067	0.066	0.14	0.16	0.55	0.55	0.16	0.17
0.063	0.073	0.15	0.15	0.56	0.56	0.16	0.17
0.066	0.075	0.13	0.14	0.54	0.56	0.15	0.16
0.062	0.073	0.14	0.15	0.56	0.57	0.16	0.16
0.065	0.063	0.14	0.15	0.57	0.58	0.16	0.17
0.065	0.072	0.15	0.15	0.54	0.55	0.15	0.17
0.074	0.074	0.15	0.15	0.60	0.58	0.16	0.17
0.073	0.076	0.14	0.15	0.60	0.61	0.17	0.18
0.067	0.069	0.16	0.16	0.65	0.64	0.18	0.19

The sample numbers used for this test were: 14, 24, 43, 60, 90, 143, 179, 238, 242 and 245.

APPENDIX 1. Homogeneity data.

Voluntary Pesticides

Cyazofamid (mg/kg)		Fenpyrazamine (mg/kg)	
Replicate 1	Replicate 2	Replicate 1	Replicate 2
0.25	0.26	0.39	0.38
0.24	0.25	0.36	0.36
0.26	0.27	0.37	0.38
0.25	0.26	0.38	0.37
0.24	0.25	0.35	0.37
0.25	0.25	0.38	0.37
0.24	0.25	0.37	0.36
0.26	0.27	0.38	0.40
0.26	0.27	0.40	0.42
0.28	0.29	0.42	0.42

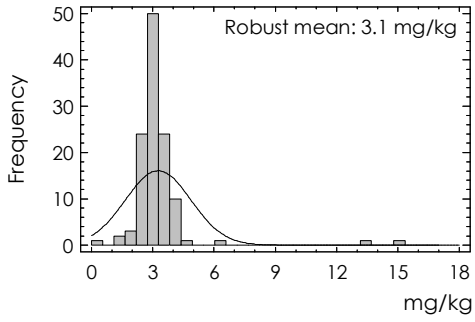
The sample numbers used for this test were: 14, 24, 43, 60, 90, 143, 179, 238, 242 and 245.

The voluntary pesticides are not covered by the ISO/IEC 17043

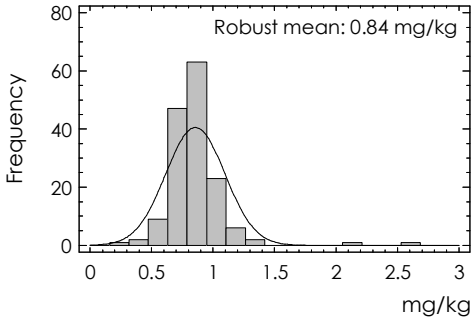
APPENDIX 2. Histograms of residue data for each pesticide from EU/EFTA laboratories.

Results presented as histograms.

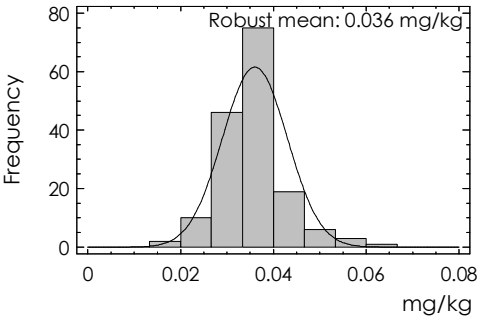
Chlorantraniliprole



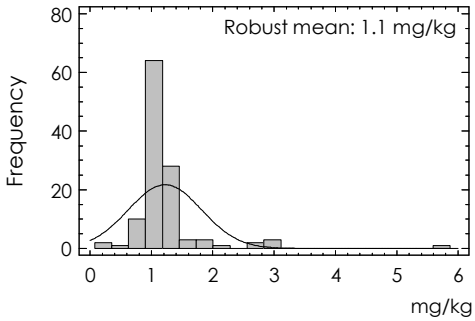
Difenoconazole



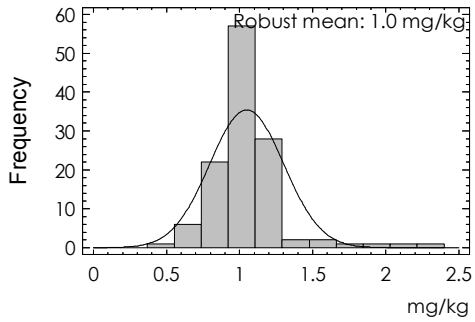
Dimethoate



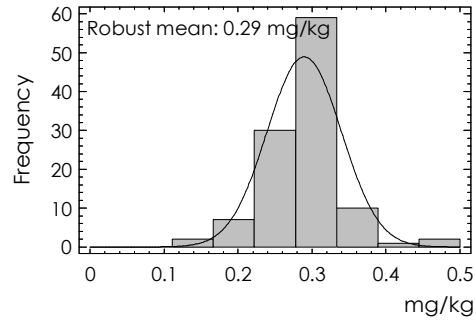
Diflubenzuron



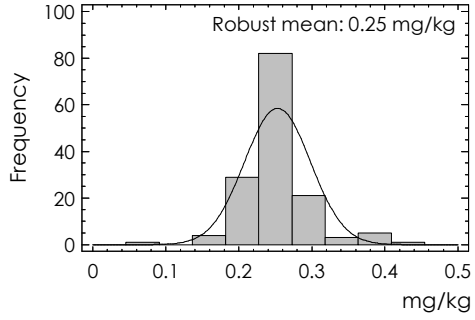
Famoxadone



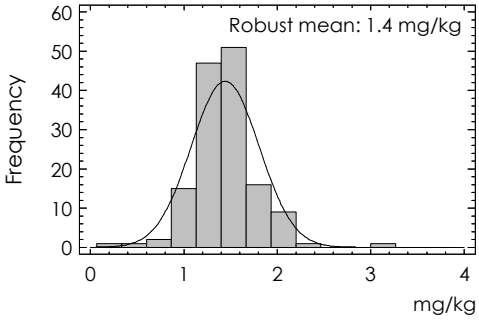
Fluopyram



Imidacloprid

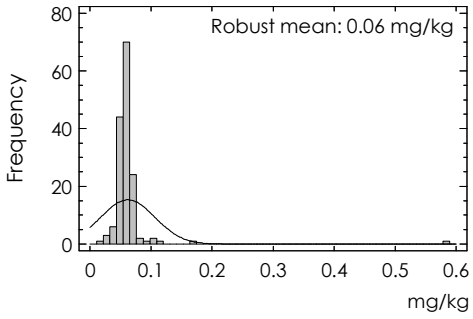


Indoxacarb

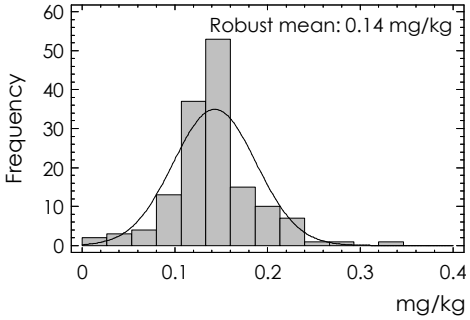


APPENDIX 2. Histograms of residue data for each pesticide from EU/EFTA laboratories.

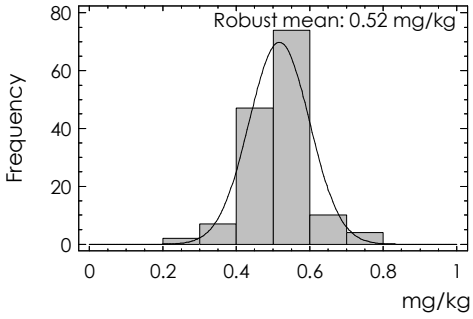
Metalaxyl and metalaxyl-M



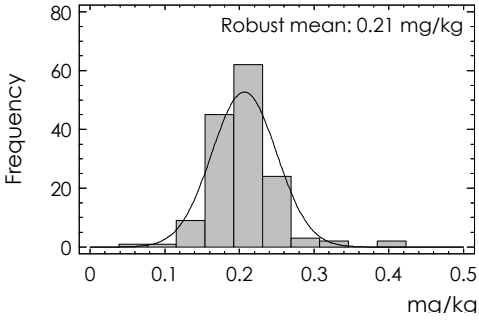
Omethoate



Thiacloprid

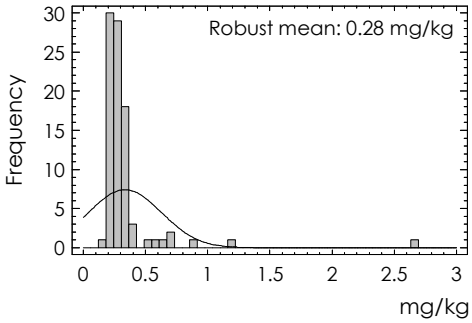


Triadimenol

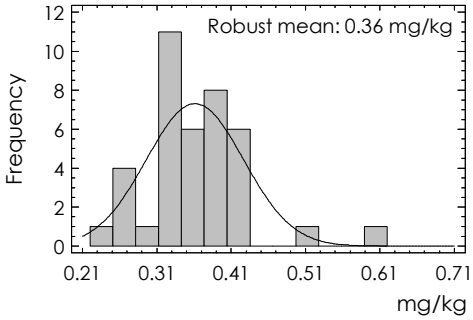


Voluntary Pesticides

Cyazofamid



Fenpyrazamine



The voluntary pesticides are not covered by the ISO/IEC 17043

Results reported by the laboratories for the mandatory pesticides chlorantraniliprole, difenoconazole, diflubenzuron, dimethoate, famoxadone, fluopyram, imidacloprid, indoxacarb (sum of indoxacarb and its R enantiomer), metalaxyl and metalaxyl-M, omethoate, thiacloprid and triadimenol (mg/kg) and their calculated z score value using FFP RSD 25 %

Lab Code	Chlorantraniliprole	z score (FFP RSD 25 %)	Difenoconazole	z score (FFP RSD 25 %)	Diflubenzuron	z score (FFP RSD 25 %)	Dimethoate	z score (FFP RSD 25 %)	Famoxadone	z score (FFP RSD 25 %)	Fluopyram	z score (FFP RSD 25 %)	Imidacloprid	z score (FFP RSD 25 %)	Indoxacarb (sum of indoxacarb and its R enantiomer)	z score (FFP RSD 25 %)	Metalaxyl and metalaxyl-M	z score (FFP RSD 25 %)	Omethoate	z score (FFP RSD 25 %)	Thiacloprid	z score (FFP RSD 25 %)	Triadimenol	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**		**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**	
Robust mean (mg/kg)	**3.071**		**0.837**		**1.121**		**0.036**		**1.026**		**0.289**		**0.250**		**1.436**		**0.058**		**0.142**		**0.516**		**0.205**	
Lab001	2.619	-0.6	0.926	0.4	1.019	-0.4	0.031	-0.5	0.850	-0.7	0.262	-0.4	0.210	-0.6	1.200	-0.7	0.063	0.4	0.103	-1.1	0.577	0.5	0.184	-0.4
Lab002	2.984	-0.1	0.898	0.3	1.106	-0.1	0.038	0.2	1.066	0.2	0.312	0.3	0.258	0.1	1.565	0.4	0.060	0.1	0.183	1.2	0.581	0.5	0.210	0.1
Lab003	3.778	0.9	1.022	0.9	1.359	0.9	0.047	1.3	1.282	1.0	0.311	0.3	0.280	0.5	1.793	1.0	0.068	0.7	0.100	-1.2	0.657	1.1	0.244	0.8
Lab004	NA	NA	NA	NA	NA	NA	ND	-3.7	NA	NA	NA	NA	0.150	-1.6	1.630	0.5	0.050	-0.5	NA	NA	0.550	0.3	NA	NA
Lab005	3.710	0.8	0.630	-1.0	NA	NA	0.030	-0.6	NA	NA	NA	NA	0.260	0.2	2.090	1.8	0.050	-0.5	0.150	0.2	0.520	0.0	0.210	0.1
Lab006	3.800	0.9	0.850	0.1	1.100	-0.1	0.048	1.4	1.100	0.3	0.320	0.4	0.250	0.0	1.400	-0.1	0.110	3.6	0.140	-0.1	0.560	0.3	0.260	1.1
Lab007	2.270	-1.0	0.831	0.0	NA	NA	0.035	-0.1	0.936	-0.4	NA	NA	0.263	0.2	1.576	0.4	0.053	-0.3	0.210	1.9	0.510	0.0	0.230	0.5
Lab008	3.860	1.0	1.090	1.2	1.450	1.2	0.041	0.6	0.873	-0.6	0.362	1.0	0.282	0.5	0.966	-1.3	0.073	1.0	0.179	1.0	0.608	0.7	0.251	0.9
Lab009	2.550	-0.7	0.686	-0.7	1.014	-0.4	0.035	-0.1	0.914	-0.4	0.255	-0.5	0.257	0.1	1.219	-0.6	0.053	-0.3	0.123	-0.5	0.424	-0.7	0.217	0.2
Lab010	2.700	-0.5	0.720	-0.6	1.200	0.3	0.035	-0.1	0.890	-0.5	0.250	-0.5	0.250	0.0	1.300	-0.4	0.060	0.1	0.140	-0.1	0.480	-0.3	0.190	-0.3
Lab011	3.556	0.6	0.914	0.4	1.319	0.7	0.040	0.5	1.171	0.6	0.301	0.2	0.262	0.2	1.905	1.3	0.063	0.3	0.141	0.0	0.565	0.4	0.193	-0.2
Lab012	2.610	-0.6	0.770	-0.3	0.740	-1.4	0.040	0.5	0.940	-0.3	NA	NA	0.250	0.0	1.080	-1.0	0.060	0.1	0.140	-0.1	0.480	-0.3	0.190	-0.3
Lab013	3.130	0.1	0.750	-0.4	0.890	-0.8	0.028	-0.9	0.870	-0.6	0.260	-0.4	0.240	-0.2	1.200	-0.7	0.049	-0.6	0.150	0.2	0.510	0.0	0.190	-0.3
Lab014	3.060	0.0	0.764	-0.3	1.020	-0.4	0.034	-0.2	0.925	-0.4	0.311	0.3	0.223	-0.4	1.360	-0.2	0.056	-0.1	0.145	0.1	0.466	-0.4	0.191	-0.3
Lab015	2.750	-0.4	0.758	-0.4	2.210	3.9	0.029	-0.8	1.060	0.1	0.335	0.6	0.269	0.3	1.500	0.2	0.050	-0.6	0.089	-1.5	0.481	-0.3	0.205	0.0
Lab016	2.900	-0.2	0.570	-1.3	0.930	-0.7	0.035	-0.1	0.580	-1.7	0.240	-0.7	0.290	0.6	1.000	-1.2	0.057	-0.1	0.160	0.5	0.530	0.1	0.170	-0.7
Lab017	2.930	-0.2	0.896	0.3	NA	NA	0.032	-0.4	1.250	0.9	NA	NA	0.221	-0.5	1.680	0.7	0.050	-0.5	0.110	-0.9	0.480	-0.3	0.310	2.1
Lab018	2.780	-0.4	0.740	-0.5	1.060	-0.2	0.022	-1.5	NA	NA	0.280	-0.1	0.260	0.2	1.500	0.2	0.057	-0.1	0.210	1.9	0.510	0.0	0.210	0.1
Lab019	2.830	-0.3	0.815	-0.1	1.081	-0.1	0.030	-0.6	1.188	0.6	0.259	-0.4	0.207	-0.7	1.420	0.0	0.050	-0.5	0.145	0.1	0.503	-0.1	0.238	0.7
Lab020	2.980	-0.1	0.896	0.3	1.207	0.3	0.033	-0.3	0.949	-0.3	0.217	-1.0	0.280	0.5	1.351	-0.2	0.057	-0.1	0.153	0.3	0.595	0.6	0.141	-1.2
Lab021	3.060	0.0	0.742	-0.5	1.040	-0.3	0.031	-0.5	1.030	0.0	0.309	0.3	0.229	-0.3	1.170	-0.7	0.030	-1.9	0.145	0.1	0.506	-0.1	0.180	-0.5
Lab022	2.100	-1.3	0.740	-0.5	0.810	-1.1	0.032	-0.4	0.840	-0.7	0.270	-0.3	0.260	0.2	1.100	-0.9	0.062	0.3	0.150	0.2	0.420	-0.7	0.150	-1.1
Lab023	3.600	0.7	0.880	0.2	1.300	0.6	0.039	0.4	1.100	0.3	0.310	0.3	0.250	0.0	1.400	-0.1	0.064	0.4	0.120	-0.6	0.570	0.4	0.210	0.1
Lab024	2.610	-0.6	0.678	-0.8	0.967	-0.5	0.037	0.1	0.987	-0.2	0.286	0.0	0.237	-0.2	1.030	-1.1	0.048	-0.7	0.219	2.2	0.561	0.3	0.141	-1.2
Lab025	3.040	0.0	0.908	0.3	1.025	-0.3	0.030	-0.6	1.015	0.0	0.250	-0.5	0.217	-0.5	1.495	0.2	0.053	-0.3	0.129	-0.4	0.530	0.1	0.222	0.3
Lab026	3.135	0.1	0.717	-0.6	0.992	-0.5	0.037	0.1	0.639	-1.5	0.265	-0.3	0.219	-0.5	1.037	-1.1	0.056	-0.1	0.125	-0.5	0.485	-0.2	0.164	-0.8
Lab027	3.300	0.3	0.800	-0.2	1.300	0.6	0.029	-0.8	ND	-4.0	NA	NA	0.250	0.0	1.500	0.2	0.054	-0.3	0.130	-0.3	0.470	-0.4	ND	-3.8
Lab028	2.800	-0.4	0.760	-0.4	1.650	1.9	0.035	-0.1	1.180	0.6	0.300	0.1	0.250	0.0	1.830	1.1	0.045	-0.9	0.180	1.1	0.540	0.2	0.125	-1.6
Lab029	3.210	0.2	0.770	-0.3	1.010	-0.4	0.032	-0.4	0.981	-0.2	0.244	-0.6	0.241	-0.1	0.520	-2.6	0.070	0.8	0.075	-1.9	0.260	-2.0	0.213	0.2
Lab030	NA	NA	0.620	-1.0	1.110	0.0	0.025	-1.2	0.940	-0.3	NA	NA	0.396	2.3	ND	-4.0	0.052	-0.4	0.256	3.2	0.572	0.4	0.160	-0.9
Lab031	NA	NA	2.560	5.0	NA	NA	0.024	-1.3	NA	NA	NA	NA	NA	NA	NA	NA	0.020	-2.6	NA	NA	NA	NA	0.280	1.5
Lab032	4.190	1.5	0.970	0.6	1.980	3.1	0.048	1.4	1.380	1.4	NA	NA	0.316	1.1	2.420	2.7	0.056	-0.1	0.129	-0.4	0.564	0.4	0.320	2.3
Lab033	2.755	-0.4	1.158	1.5	1.517	1.4	0.032	-0.4	1.643	2.4	NA	NA	0.351	1.6	2.098	1.8	0.064	0.4	0.025	-3.3	0.611	0.7	0.150	-1.1
Lab034	NA	NA	0.520	-1.5	NA	NA	0.027	-1.0	NA	NA	NA	NA	NA	NA	NA	NA	0.057	-0.1	NA	NA	NA	NA	ND	-3.8
Lab035	3.450	0.5	0.853	0.1	0.942	-0.6	0.042	0.7	1.040	0.1	0.315	0.4	0.249	0.0	1.410	-0.1	0.062	0.3	0.135	-0.2	0.492	-0.2	0.229	0.5
Lab036	NA	NA	0.770	-0.3	0.920	-0.7	0.030	-0.6	NA	NA	NA	NA	0.210	-0.6	1.410	-0.1	0.050	-0.5	0.130	-0.3	0.510	0.0	0.200	-0.1
Lab037	2.800	-0.4	0.900	0.3	1.100	-0.1	0.031	-0.5	0.990	-0.1	0.270	-0.3	0.240	-0.2	1.400	-0.1	0.049	-0.6	0.130	-0.3	0.450	-0.5	0.180	-0.5
Lab038	NA	NA	1.016	0.9	NA	NA	0.037	0.1	0.856	-0.7	0.230	-0.8	0.433	2.9	1.396	-0.1	0.034	-1.7	0.081	-1.7	0.695	1.4	0.235	0.6
Lab039	3.410	0.4	1.030	0.9	1.260	0.5	0.039	0.4	0.860	-0.6	0.330	0.6	0.247	0.0	1.520	0.2	0.065	0.5	0.140	-0.1	0.600	0.6	0.220	0.3
Lab040	0.463	-3.4	0.588	-1.2	1.024	-0.3	0.037	0.1	0.741	-1.1	0.233	-0.8	0.227	-0.4	1.129	-0.9	0.051	-0.5	0.136	-0.2	0.558	0.3	0.194	-0.2
Lab041	3.100	0.0	0.940	0.5	1.200	0.3	0.028	-0.9	1.200	0.7	0.300	0.1	0.250	0.0	1.600	0.5	0.055	-0.2	0.130	-0.3	0.520	0.0	0.190	-0.3
Lab042	NA	NA	1.010	0.8	NA	NA	0.038	0.2	NA	NA	0.317	0.4	0.268	0.3	1.850	1.2	0.078	1.4	0.112	-0.8	0.506	-0.1	0.258	1.0

APPENDIX 3. Results (mg/kg) and z-scores for FFP RSD (25 %).

Lab Code	Chlorantraniliprole	z score (FFP RSD 25 %)	Difenoconazole	z score (FFP RSD 25 %)	Diflubenzuron	z score (FFP RSD 25 %)	Dimethoate	z score (FFP RSD 25 %)	Famoxadone	z score (FFP RSD 25 %)	Fluopyram	z score (FFP RSD 25 %)	Imidacloprid	z score (FFP RSD 25 %)	Indoxacarb (sum of indoxacarb and its R enantiomer)	z score (FFP RSD 25 %)	Metalaxyl and metalaxyl-M	z score (FFP RSD 25 %)	Omethoate	z score (FFP RSD 25 %)	Thiacloprid	z score (FFP RSD 25 %)	Triadimenol	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**		**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**	
Robust mean (mg/kg)	**3.071**		**0.837**		**1.121**		**0.036**		**1.026**		**0.289**		**0.250**		**1.436**		**0.058**		**0.142**		**0.516**		**0.205**	
Lab043	2.215	-1.1	0.906	0.3	NA	NA	0.037	0.1	0.989	-0.1	NA	NA	NA	NA	1.349	-0.2	0.077	1.3	NA	NA	0.512	0.0	0.267	1.2
Lab044	2.980	-0.1	0.884	0.2	1.160	0.1	0.035	-0.1	1.052	0.1	0.304	0.2	0.243	-0.1	1.443	0.0	0.061	0.2	0.129	-0.4	0.542	0.2	0.200	-0.1
Lab045	3.118	0.1	0.950	0.5	1.162	0.1	0.041	0.6	1.029	0.0	0.350	0.8	0.246	-0.1	1.514	0.2	0.064	0.4	0.140	-0.1	0.602	0.7	0.203	0.0
Lab046	2.680	-0.5	0.747	-0.4	1.090	-0.1	0.036	0.0	1.180	0.6	0.256	-0.5	0.245	-0.1	1.270	-0.5	0.053	-0.4	0.125	-0.5	0.458	-0.5	0.182	-0.4
Lab047	NA	NA	0.665	-0.8	NA	NA	0.036	0.0	NA	NA	NA	NA	0.252	0.0	NA	NA	0.066	0.6	0.085	-1.6	0.549	0.3	0.187	-0.3
Lab048	NA	NA	0.858	0.1	NA	NA	0.035	-0.1	NA	NA	NA	NA	0.211	-0.6	1.431	0.0	0.055	-0.2	0.139	-0.1	0.463	-0.4	0.208	0.1
Lab049	3.053	0.0	0.789	-0.2	1.079	-0.1	0.033	-0.3	0.896	-0.5	0.258	-0.4	0.219	-0.5	1.338	-0.3	0.056	-0.1	0.101	-1.2	0.486	-0.2	0.167	-0.7
Lab050	1.303	-2.3	0.177	-3.2	0.303	-2.9	0.033	-0.3	ND	-4.0	0.114	-2.4	0.086	-2.6	0.865	-1.6	0.033	-1.7	0.236	2.7	0.231	-2.2	ND	-3.8
Lab051	3.640	0.7	0.810	-0.1	5.700	5.0	0.017	-2.1	2.180	4.5	0.330	0.6	0.180	-1.1	2.180	2.1	0.070	0.8	0.190	1.4	0.580	0.5	0.190	-0.3
Lab052	3.314	0.3	0.848	0.1	1.000	-0.4	0.037	0.1	1.105	0.3	0.331	0.6	0.257	0.1	1.356	-0.2	0.061	0.2	0.183	1.2	0.519	0.0	0.214	0.2
Lab053	2.760	-0.4	0.838	0.0	1.300	0.6	0.033	-0.3	1.170	0.6	0.289	0.0	0.251	0.0	1.480	0.1	0.051	-0.5	0.133	-0.2	0.553	0.3	0.208	0.1
Lab054	2.380	-0.9	0.653	-0.9	0.953	-0.6	0.032	-0.4	0.878	-0.6	0.228	-0.8	0.219	-0.5	1.240	-0.5	0.050	-0.6	0.124	-0.5	0.469	-0.4	0.159	-0.9
Lab055	3.909	1.1	1.072	1.1	1.433	1.1	0.038	0.2	1.096	0.3	0.348	0.8	0.301	0.8	1.887	1.3	0.060	0.1	0.142	0.0	0.478	-0.3	0.238	0.7
Lab056	Participation cancelled																							
Lab057	2.800	-0.4	0.900	0.3	0.155	-3.4	0.040	0.5	1.900	3.4	0.230	-0.8	0.210	-0.6	2.040	1.7	0.070	0.8	0.059	-2.3	0.510	0.0	0.220	0.3
Lab058	NA	NA	NA	NA	NA	NA	0.035	-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab059	3.434	0.5	0.819	-0.1	NA	NA	0.046	1.2	1.615	2.3	NA	NA	0.300	0.8	2.138	2.0	0.064	0.4	0.107	-1.0	0.677	1.2	0.264	1.2
Lab060	4.300	1.6	0.690	-0.7	0.850	-1.0	0.037	0.1	1.000	-0.1	0.330	0.6	0.230	-0.3	1.100	-0.9	0.074	1.1	0.140	-0.1	0.440	-0.6	0.215	0.2
Lab061	2.230	-1.1	0.801	-0.2	1.110	0.0	0.031	-0.5	1.067	0.2	0.244	-0.6	0.269	0.3	1.200	-0.7	0.050	-0.5	0.131	-0.3	0.483	-0.3	0.181	-0.5
Lab062	3.300	0.3	0.740	-0.5	0.900	-0.8	0.046	1.1	0.860	-0.6	0.320	0.4	0.190	-1.0	1.600	0.5	0.051	-0.5	0.140	-0.1	0.440	-0.6	0.210	0.1
Lab063	3.196	0.2	0.905	0.3	1.257	0.5	0.039	0.4	1.113	0.3	0.314	0.3	0.255	0.1	1.678	0.7	0.060	0.1	0.181	1.1	0.555	0.3	0.212	0.1
Lab064	NA	NA	0.870	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab065	NA	NA	0.450	-1.8	0.692	-1.5	0.029	-0.8	NA	NA	0.119	-2.4	0.265	0.2	1.340	-0.3	0.044	-1.0	0.140	-0.1	0.432	-0.7	NA	NA
Lab066	3.200	0.2	1.073	1.1	1.252	0.5	0.049	1.5	1.154	0.5	0.334	0.6	0.276	0.4	1.833	1.1	0.067	0.6	0.164	0.6	0.578	0.5	0.240	0.7
Lab067	ND	-4.0	ND	-4.0	ND	-4.0	0.049	1.5	ND	-4.0	NA	NA	0.303	0.9	0.010	-4.0	ND	-3.7	0.040	-2.9	0.315	-1.6	ND	-3.8
Lab068	2.210	-1.1	0.789	-0.2	1.100	-0.1	0.040	0.5	0.970	-0.2	0.292	0.0	0.201	-0.8	1.254	-0.5	0.058	0.0	0.145	0.1	0.513	0.0	0.205	0.0
Lab069	3.190	0.2	0.645	-0.9	1.060	-0.2	0.043	0.8	0.825	-0.8	0.287	0.0	0.286	0.6	0.885	-1.5	0.064	0.4	0.114	-0.8	0.520	0.0	0.145	-1.2
Lab070	NA	NA	0.860	0.1	0.570	-2.0	0.028	-0.9	0.670	-1.4	0.290	0.0	0.260	0.2	1.530	0.3	0.054	-0.3	0.076	-1.9	0.510	0.0	0.130	-1.5
Lab071	NA	NA	0.829	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab072	3.540	0.6	0.751	-0.4	1.190	0.2	0.034	-0.2	1.060	0.1	0.274	-0.2	0.237	-0.2	1.360	-0.2	0.055	-0.2	0.156	0.4	0.513	0.0	0.185	-0.4
Lab073	NA	NA	0.710	-0.6	NA	NA	0.030	-0.6	NA	NA	NA	NA	NA	NA	NA	NA	0.040	-1.2	NA	NA	NA	NA	0.190	-0.3
Lab074	3.852	1.0	0.956	0.6	ND	-4.0	0.030	-0.6	1.250	0.9	0.350	0.8	0.330	1.3	1.950	1.4	0.057	-0.1	0.200	1.6	0.640	1.0	0.240	0.7
Lab075	3.200	0.2	0.970	0.6	0.940	-0.6	0.039	0.4	1.200	0.7	NA	NA	0.260	0.2	2.000	1.6	0.070	0.8	0.190	1.4	0.690	1.3	0.260	1.1
Lab076	3.036	0.0	0.906	0.3	1.070	-0.2	0.034	-0.2	0.900	-0.5	0.308	0.3	0.253	0.1	1.456	0.1	0.075	1.2	0.140	-0.1	0.593	0.6	0.217	0.2
Lab077	3.100	0.0	1.000	0.8	1.070	-0.2	0.035	-0.1	1.200	0.7	0.272	-0.2	0.236	-0.2	1.300	-0.4	0.067	0.6	0.165	0.7	0.478	-0.3	0.195	-0.2
Lab078	3.076	0.0	0.829	0.0	0.905	-0.8	0.030	-0.6	0.789	-0.9	0.281	-0.1	0.238	-0.2	1.159	-0.8	0.052	-0.4	0.124	-0.5	0.536	0.2	0.209	0.1
Lab079	NA	NA	1.200	1.7	NA	NA	0.041	0.6	NA	NA	NA	NA	NA	NA	1.209	-0.6	NA	NA	0.117	-0.7	NA	NA	0.160	-0.9
Lab080	3.000	-0.1	0.970	0.6	1.334	0.8	0.061	2.8	1.186	0.6	NA	NA	0.318	1.1	1.858	1.2	0.164	5.0	0.161	0.5	0.531	0.1	0.221	0.3
Lab081	2.780	-0.4	0.542	-1.4	1.080	-0.1	0.030	-0.6	0.465	-2.2	0.208	-1.1	0.172	-1.2	1.290	-0.4	0.061	0.2	0.103	-1.1	0.451	-0.5	0.197	-0.1
Lab082	NA	NA	1.000	0.8	NA	NA	0.029	-0.8	1.190	0.6	0.210	-1.1	NA	NA	2.010	1.6	0.057	-0.1	0.160	0.5	NA	NA	0.220	0.3
Lab083	4.050	1.3	0.721	-0.6	1.120	0.0	0.035	-0.1	0.705	-1.3	0.276	-0.2	0.224	-0.4	1.370	-0.2	0.031	-1.9	0.110	-0.9	0.511	0.0	0.213	0.2
Lab084	NA	NA	1.310	2.3	1.410	1.0	0.045	1.0	NA	NA	NA	NA	0.390	2.2	1.310	-0.4	0.091	2.3	0.230	2.5	0.730	1.7	0.240	0.7
Lab085	2.973	-0.1	0.867	0.1	1.096	-0.1	0.038	0.2	1.024	0.0	0.297	0.1	0.228	-0.3	1.439	0.0	0.059	0.1	0.149	0.2	0.512	0.0	0.188	-0.3
Lab086	2.320	-1.0	0.740	-0.5	1.050	-0.3	0.023	-1.4	1.020	0.0	0.280	-0.1	0.210	-0.6	1.530	0.3	0.042	-1.1	0.160	0.5	0.480	-0.3	0.170	-0.7
Lab087	2.890	-0.2	0.930	0.4	1.030	-0.3	0.036	0.0	0.970	-0.2	0.260	-0.4	0.250	0.0	1.430	0.0	0.046	-0.8	0.138	-0.1	0.480	-0.3	0.174	-0.6
Lab088	3.400	0.4	0.890	0.3	1.200	0.3	0.045	1.0	1.200	0.7	0.310	0.3	0.260	0.2	1.500	0.2	0.070	0.8	0.130	-0.3	0.570	0.4	0.210	0.1
Lab089	3.030	-0.1	0.857	0.1	0.928	-0.7	0.033	-0.3	1.140	0.4	0.221	-0.9	0.231	-0.3	1.500	0.2	0.058	0.0	0.101	-1.2	0.527	0.1	0.176	-0.6

APPENDIX 3. Results (mg/kg) and z-scores for FFP RSD (25 %).

Lab Code	Chlorantraniliprole	z score (FFP RSD 25 %)	Difenoconazole	z score (FFP RSD 25 %)	Diflubenzuron	z score (FFP RSD 25 %)	Dimethoate	z score (FFP RSD 25 %)	Famoxadone	z score (FFP RSD 25 %)	Fluopyram	z score (FFP RSD 25 %)	Imidacloprid	z score (FFP RSD 25 %)	Indoxacarb (sum of indoxacarb and its R enantiomer)	z score (FFP RSD 25 %)	Metalaxyl and metalaxyl-M	z score (FFP RSD 25 %)	Omethoate	z score (FFP RSD 25 %)	Thiacloprid	z score (FFP RSD 25 %)	Triadimenol	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**		**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**	
Robust mean (mg/kg)	**3.071**		**0.837**		**1.121**		**0.036**		**1.026**		**0.289**		**0.250**		**1.436**		**0.058**		**0.142**		**0.516**		**0.205**	
Lab090	3.052	0.0	0.825	-0.1	1.182	0.2	0.036	0.0	0.986	-0.2	0.296	0.1	0.254	0.1	1.300	-0.4	0.058	0.0	0.191	1.4	0.532	0.1	0.229	0.5
Lab091	ND	-4.0	NA	NA	NA	NA	0.024	-1.3	NA	NA	NA	NA	0.226	-0.4	1.360	-0.2	0.031	-1.9	0.165	0.7	0.550	0.3	0.390	3.6
Lab092	NA	NA	NA	NA	NA	NA	0.040	0.5	NA	NA	NA	NA	0.200	-0.8	1.300	-0.4	0.060	0.1	NA	NA	0.530	0.1	NA	NA
Lab093	NA	NA	0.860	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.550	0.3	0.062	0.3	NA	NA	NA	NA	0.205	0.0
Lab094	NA	NA	0.840	0.0	NA	NA	0.040	0.5	1.020	0.0	0.280	-0.1	0.260	0.2	1.320	-0.3	0.070	0.8	0.160	0.5	0.450	-0.5	0.200	-0.1
Lab095	NA	NA	1.022	0.9	NA	NA	0.043	0.8	NA	NA	NA	NA	0.231	-0.3	1.620	0.5	0.063	0.4	0.182	1.1	0.503	-0.1	0.196	-0.2
Lab096	3.540	0.6	0.834	0.0	1.224	0.4	0.037	0.1	0.941	-0.3	0.272	-0.2	0.248	0.0	1.334	-0.3	0.061	0.2	0.158	0.5	0.515	0.0	0.244	0.8
Lab097	3.324	0.3	0.879	0.2	1.167	0.2	0.039	0.4	1.040	0.1	0.313	0.3	0.253	0.1	1.609	0.5	0.060	0.1	0.117	-0.7	0.567	0.4	0.200	-0.1
Lab098	6.530	4.5	0.918	0.4	NA*	NA*	0.037	0.2	NA*	NA*	0.401	1.5	0.224	-0.4	NA	NA	0.071	0.9	0.209	1.9	0.431	-0.7	0.243	0.8
Lab099	2.880	-0.2	0.720	-0.6	NA	NA	0.030	-0.6	NA	NA	NA	NA	0.220	-0.5	NA	NA	NA	NA	0.130	-0.3	NA	NA	NA	NA
Lab100	NA	NA	0.830	0.0	NA	NA	0.042	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab101	2.948	-0.2	0.721	-0.6	0.715	-1.4	0.031	-0.5	NA	NA	NA	NA	0.202	-0.8	1.508	0.2	0.040	-1.2	0.120	-0.6	0.448	-0.5	0.166	-0.8
Lab102	NA	NA	0.923	0.4	ND	-4.0	NA	NA	1.050	0.1	NA	NA	0.354	1.7	0.071	-3.8	0.054	-0.3	NA	NA	0.530	0.1	0.248	0.9
Lab103	NA	NA	0.890	0.3	1.540	1.5	0.040	0.5	ND	-4.0	NA	NA	0.280	0.5	1.830	1.1	0.057	-0.1	0.180	1.1	0.570	0.4	0.110	-1.8
Lab104	NA	NA	0.930	0.4	2.466	4.8	0.036	0.0	NA	NA	NA	NA	0.281	0.5	1.555	0.3	0.058	0.0	0.135	-0.2	NA	NA	0.170	-0.7
Lab105	NA	NA	0.986	0.7	NA	NA	0.046	1.1	NA	NA	NA	NA	0.304	0.9	NA	NA	NA	NA	NA	NA	NA	NA	0.184	-0.4
Lab106	ND	-4.0	0.561	-1.3	0.939	-0.6	0.060	2.7	0.923	-0.4	0.224	-0.9	0.225	-0.4	1.550	0.3	0.057	-0.1	0.115	-0.8	0.383	-1.0	0.177	-0.5
Lab107	3.060	0.0	0.829	0.0	1.043	-0.3	0.022	-1.5	NA	NA	NA	NA	0.185	-1.0	1.266	-0.5	0.063	0.4	0.110	-0.9	0.482	-0.3	0.210	0.1
Lab108	1.600	-1.9	0.900	0.3	0.950	-0.6	0.032	-0.4	NA	NA	0.260	-0.4	0.250	0.0	1.150	-0.8	0.060	0.1	0.125	-0.5	0.410	-0.8	0.210	0.1
Lab109	2.605	-0.6	0.847	0.0	1.221	0.4	0.030	-0.6	NA	NA	0.266	-0.3	0.214	-0.6	1.517	0.2	0.051	-0.5	0.123	-0.5	0.444	-0.6	0.159	-0.9
Lab110	2.800	-0.4	0.750	-0.4	1.300	0.6	0.039	0.4	0.970	-0.2	0.250	-0.5	0.230	-0.3	1.300	-0.4	0.110	3.6	0.120	-0.6	0.530	0.1	0.190	-0.3
Lab111	NA	NA	0.927	0.4	1.380	0.9	0.035	-0.1	1.250	0.9	0.264	-0.3	0.231	-0.3	1.420	0.0	0.051	-0.5	0.125	-0.5	0.525	0.1	0.280	1.5
Lab112	NA	NA	0.502	-1.6	NA	NA	ND	-3.7	0.156	-3.4	NA	NA	NA	NA	ND	-4.0	ND	-3.3	NA	NA	NA	NA	0.349	2.8
Lab113	NA	NA	NA	NA	NA	NA	0.030	-0.6	ND	-4.0	NA	NA	0.200	-0.8	0.040	-3.9	NA	NA	ND	-3.9	NA	NA	0.290	1.7
Lab114	5.170	2.7	1.190	1.7	1.930	2.9	0.030	-0.6	1.080	0.2	NA	NA	0.290	0.6	2.350	2.5	0.070	0.8	0.120	-0.6	0.700	1.4	0.270	1.3
Lab115	2.543	-0.7	0.864	0.1	1.188	0.2	0.043	0.8	1.380	1.4	0.315	0.4	0.238	-0.2	1.306	-0.4	0.060	0.1	0.120	-0.6	0.468	-0.4	0.216	0.2
Lab117	3.000	-0.1	0.830	0.0	1.200	0.3	0.031	-0.5	0.940	-0.3	0.310	0.3	0.250	0.0	1.700	0.7	0.052	-0.4	0.130	-0.3	0.520	0.0	0.220	0.3
Lab118	2.940	-0.2	0.650	-0.9	1.120	0.0	0.025	-1.2	1.040	0.1	0.220	-1.0	0.260	0.2	1.430	0.0	0.045	-0.9	0.120	-0.6	0.415	-0.8	0.140	-1.3
Lab119	NA	NA	0.536	-1.4	NA	NA	0.036	0.0	NA	NA	0.315	0.4	0.261	0.2	0.621	-2.3	0.052	-0.4	0.046	-2.7	0.582	0.5	0.260	1.1
Lab120	NA	NA	NA	NA	NA	NA	0.037	0.1	0.900	-0.5	0.300	0.1	NA	NA	NA	NA	0.059	0.1	0.005	-3.9	NA	NA	0.190	-0.3
Lab121	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab122	NA	NA	0.680	-0.7	NA	NA	0.031	-0.5	NA	NA	NA	NA	NA	NA	NA	NA	0.063	0.4	0.103	-1.1	NA	NA	0.201	-0.1
Lab123	3.037	0.0	0.751	-0.4	1.097	-0.1	0.040	0.4	0.950	-0.3	0.299	0.1	0.260	0.2	1.060	-1.0	0.055	-0.2	0.218	2.1	0.598	0.6	0.201	-0.1
Lab124	3.200	0.2	0.980	0.7	1.170	0.2	0.045	1.0	1.100	0.3	0.350	0.8	0.250	0.0	1.600	0.5	0.070	0.8	0.190	1.4	0.600	0.6	0.200	-0.1
Lab125	2.255	-1.1	1.243	1.9	1.007	-0.4	0.036	0.0	1.135	0.4	0.285	-0.1	0.255	0.1	1.307	-0.4	0.058	0.0	0.112	-0.8	0.501	-0.1	0.170	-0.7
Lab126	3.260	0.2	1.173	1.6	1.421	1.1	0.040	0.5	1.041	0.1	0.290	0.0	0.281	0.5	1.501	0.2	0.059	0.1	0.173	0.9	0.703	1.4	0.211	0.1
Lab127	2.480	-0.8	0.670	-0.8	1.930	2.9	0.034	-0.2	0.823	-0.8	0.253	-0.5	0.204	-0.7	1.080	-1.0	0.045	-0.9	0.141	0.0	0.373	-1.1	0.170	-0.7
Lab128	3.730	0.9	0.756	-0.4	0.639	-1.7	0.030	-0.6	1.070	0.2	ND	-3.9	0.255	0.1	1.560	0.3	0.050	-0.5	0.107	-1.0	0.503	-0.1	0.154	-1.0
Lab129	No results reported																							
Lab130	3.100	0.0	1.000	0.8	1.300	0.6	0.038	0.2	1.200	0.7	0.280	-0.1	0.280	0.5	1.700	0.7	0.068	0.7	0.160	0.5	0.530	0.1	0.220	0.3
Lab131	NA	NA	ND	-4.0	NA	NA	0.035	-0.1	NA	NA	NA	NA	0.270	0.3	ND	-4.0	0.059	0.1	0.130	-0.3	0.490	-0.2	0.240	0.7
Lab132	3.470	0.5	0.821	-0.1	0.684	-1.6	0.055	2.1	1.178	0.6	0.243	-0.6	0.232	-0.3	1.471	0.1	0.058	0.0	0.217	2.1	0.659	1.1	0.224	0.4
Lab133	2.660	-0.5	0.743	-0.4	1.110	0.0	0.034	-0.2	1.080	0.2	0.280	-0.1	0.266	0.3	1.650	0.6	0.055	-0.2	0.131	-0.3	0.480	-0.3	0.208	0.1
Lab134	3.000	-0.1	0.871	0.2	1.190	0.2	0.038	0.3	0.986	-0.2	0.300	0.1	0.246	-0.1	1.450	0.0	0.061	0.2	0.149	0.2	0.551	0.3	0.206	0.0
Lab135	4.240	1.5	0.760	-0.4	1.200	0.3	0.031	-0.5	0.572	-1.8	0.290	0.0	0.240	-0.2	1.150	-0.8	0.060	0.1	0.130	-0.3	0.570	0.4	0.182	-0.4
Lab136	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab137	NA	NA	0.937	0.5	1.132	0.0	0.037	0.1	1.113	0.3	0.320	0.4	0.254	0.1	1.527	0.3	0.060	0.1	0.220	2.2	0.522	0.0	0.214	0.2

APPENDIX 3. Results (mg/kg) and z-scores for FFP RSD (25 %).

Lab Code	Chlorantraniliprole	z score (FFP RSD 25 %)	Difenoconazole	z score (FFP RSD 25 %)	Diflubenzuron	z score (FFP RSD 25 %)	Dimethoate	z score (FFP RSD 25 %)	Famoxadone	z score (FFP RSD 25 %)	Fluopyram	z score (FFP RSD 25 %)	Imidacloprid	z score (FFP RSD 25 %)	Indoxacarb (sum of indoxacarb and its R enantiomer)	z score (FFP RSD 25 %)	Metalaxyl and metalaxyl-M	z score (FFP RSD 25 %)	Omethoate	z score (FFP RSD 25 %)	Thiacloprid	z score (FFP RSD 25 %)	Triadimenol	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**		**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**	
Robust mean (mg/kg)	**3.071**		**0.837**		**1.121**		**0.036**		**1.026**		**0.289**		**0.250**		**1.436**		**0.058**		**0.142**		**0.516**		**0.205**	
Lab138	3.000	-0.1	0.800	-0.2	NA	NA	0.022	-1.5	1.130	0.4	NA	NA	0.260	0.2	1.620	0.5	0.069	0.8	0.190	1.4	0.530	0.1	0.210	0.1
Lab139	3.020	-0.1	0.723	-0.5	2.880	5.0	0.035	-0.1	1.090	0.2	0.352	0.9	0.235	-0.2	1.120	-0.9	0.060	0.1	0.102	-1.1	0.533	0.1	0.185	-0.4
Lab140	NA	NA	2.210	5.0	NA	NA	ND	-3.7	NA	NA	0.250	-0.5	NA	NA	ND	-4.0	0.039	-1.3	NA	NA	NA	NA	0.182	-0.4
Lab141	NA	NA	0.420	-2.0	NA	NA	ND	-3.7	ND	-4.0	NA	NA	NA	NA	NA	NA	ND	-3.3	ND	-3.9	NA	NA	ND	-3.8
Lab142	3.400	0.4	0.680	-0.7	1.000	-0.4	0.037	0.1	0.830	-0.8	0.320	0.4	0.270	0.3	1.800	1.0	0.042	-1.1	0.130	-0.3	0.490	-0.2	0.110	-1.8
Lab143	No results reported																							
Lab144	2.600	-0.6	1.100	1.3	1.300	0.6	0.040	0.5	1.000	-0.1	0.280	-0.1	0.270	0.3	1.700	0.7	0.044	-1.0	0.160	0.5	0.590	0.6	0.190	-0.3
Lab145	NA	NA	0.860	0.1	NA	NA	0.037	0.1	0.990	-0.1	NA	NA	NA	NA	1.390	-0.1	0.052	-0.4	0.230	2.5	NA	NA	0.220	0.3
Lab146	NA	NA	NA	NA	NA	NA	0.039	0.4	NA	NA	NA	NA	NA	NA	NA	NA	0.109	3.5	NA	NA	NA	NA	0.173	-0.6
Lab147	4.350	1.7	1.200	1.7	NA	NA	0.040	0.5	1.390	1.4	0.320	0.4	NA	NA	1.430	0.0	0.060	0.1	NA	NA	NA	NA	0.240	0.7
Lab148	2.600	-0.6	0.842	0.0	1.100	-0.1	0.033	-0.3	1.010	-0.1	0.305	0.2	0.240	-0.2	1.710	0.8	0.044	-0.9	0.160	0.5	0.540	0.2	0.171	-0.7
Lab149	NA	NA	0.890	0.3	NA	NA	0.038	0.2	NA	NA	0.218	-1.0	0.277	0.4	1.300	-0.4	0.052	-0.4	NA	NA	0.417	-0.8	0.208	0.1
Lab150	2.710	-0.5	0.726	-0.5	1.060	-0.2	0.043	0.8	1.030	0.0	0.291	0.0	0.209	-0.7	1.340	-0.3	0.061	0.2	0.145	0.1	0.509	-0.1	0.148	-1.1
Lab151	NA	NA	NA	NA	NA	NA	0.033	-0.3	NA	NA	NA	NA	0.230	-0.3	NA	NA	0.045	-0.9	0.092	-1.4	0.390	-1.0	NA	NA
Lab152	2.690	-0.5	0.751	-0.4	1.080	-0.1	0.036	0.1	0.921	-0.4	0.279	-0.1	0.235	-0.2	1.350	-0.2	0.056	-0.1	0.146	0.1	0.484	-0.2	0.188	-0.3
Lab153	NA	NA	NA	NA	NA	NA	0.028	-0.9	NA	NA	NA	NA	0.212	-0.6	NA	NA	0.055	-0.2	NA	NA	NA	NA	NA	NA
Lab154	3.100	0.0	0.780	-0.3	1.800	2.4	0.037	0.1	0.960	-0.3	0.270	-0.3	0.370	1.9	1.400	-0.1	0.061	0.2	0.145	0.1	0.520	0.0	0.240	0.7
Lab155	NA	NA	0.640	-0.9	0.990	-0.5	0.040	0.5	1.070	0.2	0.340	0.7	0.250	0.0	1.260	-0.5	0.063	0.4	0.166	0.7	0.450	-0.5	0.195	-0.2
Lab156	4.850	2.3	0.846	0.0	NA	NA	0.045	1.0	0.930	-0.4	0.312	0.3	NA	NA	NA	NA	0.058	0.0	0.177	1.0	NA	NA	0.231	0.5
Lab157	3.400	0.4	0.940	0.5	1.300	0.6	0.053	1.9	NA	NA	NA	NA	0.400	2.4	1.700	0.7	0.075	1.2	0.140	-0.1	0.740	1.7	0.054	-2.9
Lab158	2.100	-1.3	1.100	1.3	2.600	5.0	0.026	-1.1	ND	-4.0	0.220	-1.0	0.200	-0.8	0.200	-3.4	0.050	-0.5	0.140	-0.1	0.320	-1.5	0.230	0.5
Lab159	NA	NA	NA	NA	NA	NA	0.042	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.116	-0.7	NA	NA	NA	NA
Lab160	3.670	0.8	0.841	0.0	1.100	-0.1	0.036	0.0	1.170	0.6	0.299	0.1	0.206	-0.7	1.660	0.6	0.062	0.3	0.147	0.1	0.492	-0.2	0.192	-0.2
Lab161	2.849	-0.3	0.884	0.2	1.053	-0.2	0.045	1.0	0.950	-0.3	0.315	0.4	0.286	0.6	1.521	0.2	0.066	0.6	0.328	5.0	0.582	0.5	0.223	0.4
Lab162	4.260	1.5	0.703	-0.6	2.650	5.0	0.030	-0.6	0.680	-1.3	0.316	0.4	0.283	0.5	1.200	-0.7	0.046	-0.8	0.179	1.0	0.383	-1.0	0.233	0.6
Lab163	NA	NA	0.879	0.2	NA	NA	0.057	2.4	NA	NA	NA	NA	NA	NA	NA	NA	0.057	-0.1	NA	NA	NA	NA	0.228	0.5
Lab164	NA	NA	0.650	-0.9	NA	NA	0.043	0.8	NA	NA	NA	NA	0.252	0.0	1.120	-0.9	0.061	0.2	0.135	-0.2	0.550	0.3	0.230	0.5
Lab165	NA	NA	1.110	1.3	1.620	1.8	0.039	0.4	1.790	3.0	0.382	1.3	0.254	0.1	2.180	2.1	0.058	0.0	0.140	-0.1	0.477	-0.3	ND	-3.8
Lab166	NA	NA	NA	NA	NA	NA	0.058	2.5	NA	NA	NA	NA	NA	NA	NA	NA	0.057	-0.1	0.126	-0.4	NA	NA	0.228	0.5
Lab167	1.600	-1.9	0.870	0.2	0.880	-0.9	0.042	0.7	NA	NA	0.250	-0.5	0.320	1.1	1.390	-0.1	0.075	1.2	0.150	0.2	0.540	0.2	0.300	1.9
Lab168	2.740	-0.4	0.880	0.2	1.050	-0.3	0.030	-0.6	0.790	-0.9	0.480	2.6	0.270	0.3	1.410	-0.1	0.070	0.8	ND	-3.9	0.530	0.1	0.250	0.9
Lab169	2.500	-0.7	0.852	0.1	1.060	-0.2	0.040	0.5	1.160	0.5	0.316	0.4	0.240	-0.2	1.020	-1.2	0.050	-0.5	0.130	-0.3	0.480	-0.3	0.240	0.7
Lab170	NA	NA	0.950	0.5	1.050	-0.3	0.040	0.5	1.150	0.5	NA	NA	0.250	0.0	1.500	0.2	0.060	0.1	0.040	-2.9	0.455	-0.5	0.400	3.8
Lab171	Participation cancelled																							
Lab172	NA	NA	NA	NA	0.820	-1.1	0.030	-0.6	NA	NA	NA	NA	0.180	-1.1	NA	NA	ND	-3.3	0.080	-1.7	0.420	-0.7	NA	NA
Lab173	2.980	-0.1	0.770	-0.3	0.950	-0.6	0.032	-0.4	0.970	-0.2	ND	-3.9	0.190	-1.0	1.210	-0.6	0.070	0.8	0.086	-1.6	0.790	2.1	0.180	-0.5
Lab174	4.110	1.4	1.330	2.4	1.000	-0.4	0.045	1.0	2.220	4.7	0.260	-0.4	0.280	0.5	3.150	4.8	0.058	0.0	0.180	1.1	0.520	0.0	NA	NA
Lab175	14.960	5.0	0.720	-0.6	2.850	5.0	0.040	0.5	1.000	-0.1	0.290	0.0	0.300	0.8	1.650	0.6	NA	NA	0.140	-0.1	0.500	-0.1	0.200	-0.1
Lab176	NA	NA	0.934	0.5	NA	NA	0.037	0.1	1.087	0.2	NA	NA	0.221	-0.5	1.627	0.5	0.107	3.4	0.193	1.4	0.481	-0.3	0.187	-0.3
Lab177	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab178	3.320	0.3	0.960	0.6	2.880	5.0	0.037	0.1	1.120	0.4	0.320	0.4	0.290	0.6	1.760	0.9	0.074	1.1	0.150	0.2	0.480	-0.3	0.230	0.5
Lab179	NA	NA	0.900	0.3	1.190	0.2	0.024	-1.3	1.150	0.5	NA	NA	0.220	-0.5	1.590	0.4	0.580	5.0	0.099	-1.2	0.370	-1.1	0.220	0.3
Lab180	NA	NA	0.647	-0.9	NA	NA	0.032	-0.4	NA	NA	NA	NA	0.196	-0.9	1.310	-0.4	0.049	-0.6	0.148	0.2	0.451	-0.5	0.198	-0.1
Lab181	2.260	-1.1	0.913	0.4	0.996	-0.4	0.036	0.0	1.020	0.0	0.314	0.3	0.261	0.2	1.550	0.3	0.055	-0.2	0.135	-0.2	0.477	-0.3	0.225	0.4
Lab182	2.740	-0.4	0.749	-0.4	1.140	0.1	0.037	0.1	0.955	-0.3	0.288	0.0	0.392	2.3	1.350	-0.2	0.052	-0.4	0.138	-0.1	0.372	-1.1	0.162	-0.8
Lab183	2.076	-1.3	0.729	-0.5	1.297	0.6	0.031	-0.5	0.982	-0.2	NA	NA	0.246	-0.1	1.404	-0.1	0.053	-0.3	0.144	0.1	0.499	-0.1	0.170	-0.7
Lab184	NA	NA	0.799	-0.2	NA	NA	0.026	-1.1	NA	NA	NA	NA	0.282	0.5	1.500	0.2	0.052	-0.4	0.150	0.2	0.656	1.1	0.295	1.8

Lab Code	Chlorantraniliprole	z score (FFP RSD 25 %)	Difenoconazole	z score (FFP RSD 25 %)	Diflubenzuron	z score (FFP RSD 25 %)	Dimethoate	z score (FFP RSD 25 %)	Famoxadone	z score (FFP RSD 25 %)	Fluopyram	z score (FFP RSD 25 %)	Imidacloprid	z score (FFP RSD 25 %)	Indoxacarb (sum of indoxacarb and its R enantiomer)	z score (FFP RSD 25 %)	Metalaxyl and metalaxyl-M	z score (FFP RSD 25 %)	Omethoate	z score (FFP RSD 25 %)	Thiacloprid	z score (FFP RSD 25 %)	Triadimenol	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**		**0.01**		**0.01**		**0.01**		**0.003**		**0.01**		**0.01**	
Robust mean (mg/kg)	**3.071**		**0.837**		**1.121**		**0.036**		**1.026**		**0.289**		**0.250**		**1.436**		**0.058**		**0.142**		**0.516**		**0.205**	
Lab185	3.500	0.6	0.810	-0.1	1.000	-0.4	0.035	-0.1	1.100	0.3	0.260	-0.4	0.230	-0.3	1.500	0.2	0.056	-0.1	0.120	-0.6	0.450	-0.5	0.180	-0.5
Lab186	2.880	-0.2	0.863	0.1	0.912	-0.7	0.035	-0.1	1.120	0.4	0.451	2.2	0.255	0.1	1.200	-0.7	0.066	0.6	0.280	3.9	0.560	0.3	0.215	0.2
Lab187	3.510	0.6	0.880	0.2	1.120	0.0	0.040	0.5	0.780	-1.0	ND	-3.9	0.240	-0.2	0.930	-1.4	0.063	0.4	0.141	0.0	0.570	0.4	0.190	-0.3
Lab188	NA	NA	0.604	-1.1	NA	NA	0.032	-0.4	NA	NA	NA	NA	ND	-3.8	1.590	0.4	NA	NA	NA	NA	ND	-3.9	NA	NA
Lab189	NA	NA	0.981	0.7	NA	NA	0.032	-0.4	NA	NA	NA	NA	0.247	0.0	1.365	-0.2	0.048	-0.7	NA	NA	NA	NA	0.154	-1.0
Lab190	3.268	0.3	0.843	0.0	1.023	-0.3	0.040	0.5	0.994	-0.1	0.317	0.4	0.301	0.8	1.434	0.0	NA	NA	0.122	-0.6	0.553	0.3	0.184	-0.4
Lab191	2.390	-0.9	0.602	-1.1	1.030	-0.3	0.020	-1.8	0.880	-0.6	NA	NA	0.268	0.3	1.170	-0.7	0.054	-0.3	ND	-3.9	0.491	-0.2	0.158	-0.9
Lab192	13.520	5.0	1.000	0.8	1.120	0.0	0.040	0.5	1.090	0.2	NA	NA	0.246	-0.1	1.600	0.5	0.060	0.1	0.159	0.5	0.483	-0.3	0.231	0.5

NA: Not analysed NA*: A numerical value was not reported
ND: Not detected (False negative)

Results reported by the laboratories for the voluntary pesticides cyazofamid and fenpyrazamine (mg/kg) and their calculated z score value using FFP RSD 25 %. The voluntary pesticides are not covered by the ISO/IEC 17043

Lab Code	Cyazofamid	z score (FFP RSD 25 %)	Fenpyrazamine	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**	
Robust mean (mg/kg)	**0.279**		**0.357**	
Lab001	0.208	-1.0	0.268	-1.0
Lab002	0.260	-0.3	0.334	-0.3
Lab003	NA	NA	NA	NA
Lab004	NA	NA	NA	NA
Lab005	NA	NA	NA	NA
Lab006	0.290	0.2	0.400	0.5
Lab007	0.299	0.3	NA	NA
Lab008	0.286	0.1	NA	NA
Lab009	0.185	-1.3	NA	NA
Lab010	0.230	-0.7	0.240	-1.3
Lab011	0.323	0.6	0.347	-0.1
Lab012	0.260	-0.3	NA	NA
Lab013	0.200	-1.1	NA	NA
Lab014	0.220	-0.8	0.341	-0.2
Lab015	0.566	4.1	0.394	0.4
Lab016	0.180	-1.4	0.280	-0.9
Lab017	ND	-3.9	NA	NA
Lab018	0.320	0.6	NA	NA
Lab019	0.262	-0.2	0.314	-0.5
Lab020	0.273	-0.1	0.376	0.2

APPENDIX 3. Results (mg/kg) and z-scores for FFP RSD (25 %).

Lab Code	Cyazofamid	z score (FFP RSD 25 %)	Fenpyrazamine	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**	
Robust mean (mg/kg)	**0.279**		**0.357**	
Lab021	NA	NA	NA	NA
Lab022	0.870	8.5	NA	NA
Lab023	0.280	0.0	0.370	0.1
Lab024	NA	NA	NA	NA
Lab025	0.240	-0.6	0.342	-0.2
Lab026	0.221	-0.8	NA	NA
Lab027	0.290	0.2	NA	NA
Lab028	0.230	-0.7	0.380	0.3
Lab029	0.240	-0.6	NA	NA
Lab030	0.676	5.7	NA	NA
Lab031	NA	NA	NA	NA
Lab032	0.344	0.9	NA	NA
Lab033	NA	NA	NA	NA
Lab034	NA	NA	NA	NA
Lab035	0.251	-0.4	NA	NA
Lab036	NA	NA	NA	NA
Lab037	0.240	-0.6	NA	NA
Lab038	NA	NA	NA	NA
Lab039	0.254	-0.4	0.410	0.6
Lab040	0.208	-1.0	0.262	-1.1
Lab041	0.250	-0.4	0.380	0.3
Lab042	NA	NA	NA	NA
Lab043	NA	NA	NA	NA
Lab044	0.331	0.7	0.374	0.2
Lab045	0.270	-0.1	0.406	0.5
Lab046	0.246	-0.5	0.345	-0.1
Lab047	NA	NA	NA	NA
Lab048	NA	NA	NA	NA
Lab049	0.226	-0.8	0.314	-0.5
Lab050	NA	NA	NA	NA
Lab051	1.220	13.5	0.510	1.7
Lab052	0.348	1.0	0.342	-0.2
Lab053	0.339	0.9	0.322	-0.4
Lab054	0.211	-1.0	NA	NA
Lab055	0.320	0.6	0.427	0.8
Lab056	Participation cancelled			
Lab057	NA	NA	NA	NA
Lab058	NA	NA	NA	NA
Lab059	NA	NA	NA	NA
Lab060	NA	NA	NA	NA
Lab061	0.221	-0.8	0.343	-0.2
Lab062	0.230	-0.7	NA	NA
Lab063	0.281	0.0	NA	NA
Lab064	NA	NA	NA	NA
Lab065	NA	NA	NA	NA
Lab066	0.312	0.5	0.408	0.6
Lab067	ND	-3.9	NA	NA
Lab068	0.233	-0.7	NA	NA
Lab069	NA	NA	NA	NA
Lab070	NA	NA	NA	NA

APPENDIX 3. Results (mg/kg) and z-scores for FFP RSD (25 %).

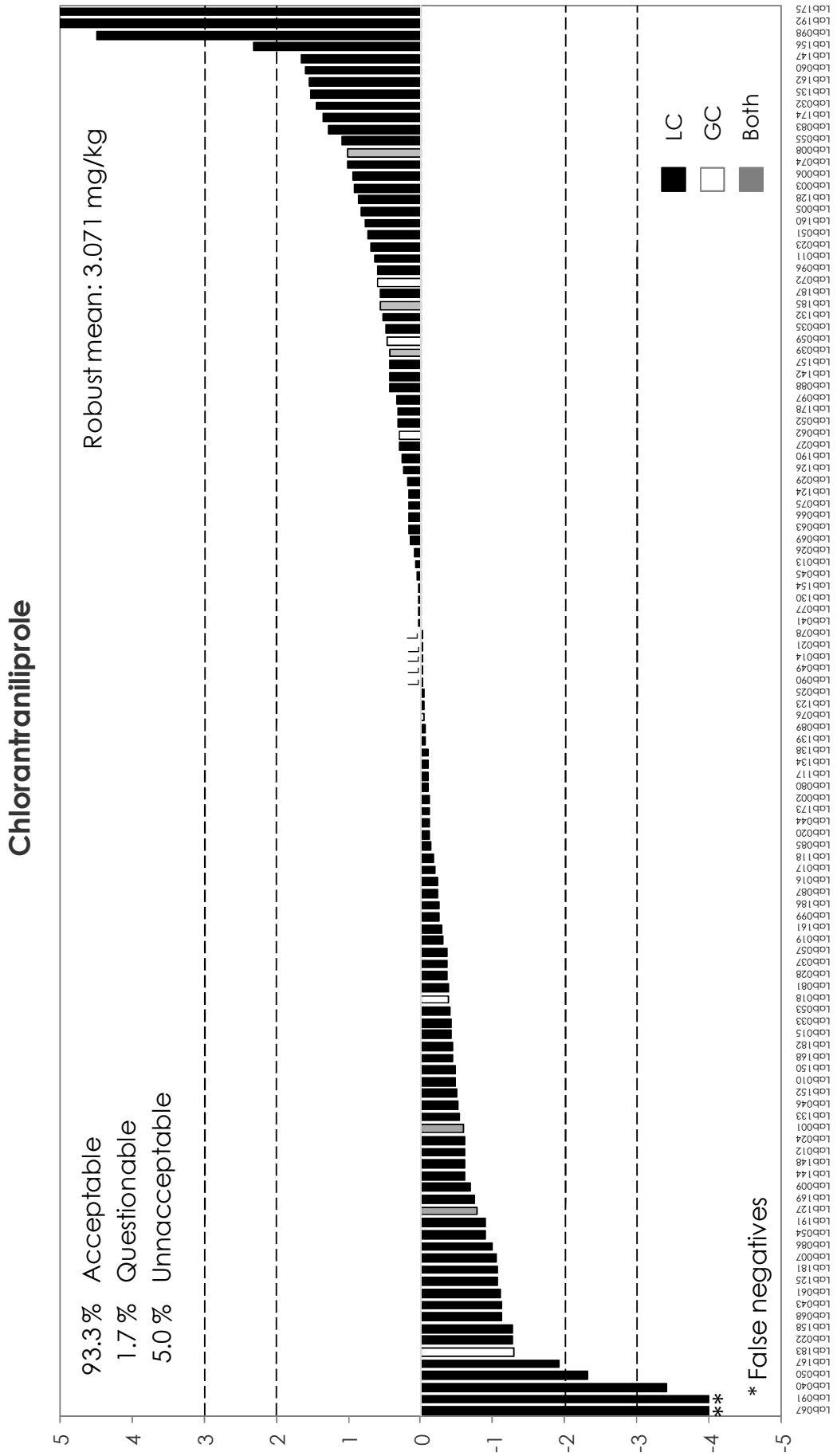
Lab Code	Cyazofamid	z score (FFP RSD 25 %)	Fenpyrazamine	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**	
Robust mean (mg/kg)	**0.279**		**0.357**	
Lab071	NA	NA	NA	NA
Lab072	0.323	0.6	NA	NA
Lab073	NA	NA	NA	NA
Lab074	0.402	1.8	NA	NA
Lab075	0.360	1.2	NA	NA
Lab076	0.246	-0.5	NA	NA
Lab077	0.240	-0.6	NA	NA
Lab078	0.308	0.4	NA	NA
Lab079	NA	NA	NA	NA
Lab080	NA	NA	NA	NA
Lab081	0.193	-1.2	NA	NA
Lab082	NA	NA	NA	NA
Lab083	NA	NA	NA	NA
Lab084	NA	NA	NA	NA
Lab085	0.306	0.4	0.321	-0.4
Lab086	NA	NA	NA	NA
Lab087	0.220	-0.8	0.360	0.0
Lab088	0.230	-0.7	0.370	0.1
Lab089	NA	NA	NA	NA
Lab090	0.264	-0.2	NA	NA
Lab091	NA	NA	NA	NA
Lab092	NA	NA	NA	NA
Lab093	NA	NA	NA	NA
Lab094	NA	NA	NA	NA
Lab095	0.402	1.8	NA	NA
Lab096	0.240	-0.6	0.336	-0.2
Lab097	0.271	-0.1	NA	NA
Lab098	NA	NA	NA	NA
Lab099	NA	NA	NA	NA
Lab100	NA	NA	NA	NA
Lab101	NA	NA	NA	NA
Lab102	ND	-3.9	NA	NA
Lab103	0.250	-0.4	NA	NA
Lab104	NA	NA	NA	NA
Lab105	NA	NA	NA	NA
Lab106	ND	-3.9	0.197	-1.8
Lab107	NA	NA	NA	NA
Lab108	NA	NA	NA	NA
Lab109	NA	NA	NA	NA
Lab110	0.250	-0.4	NA	NA
Lab111	NA	NA	NA	NA
Lab112	NA	NA	NA	NA
Lab113	NA	NA	NA	NA
Lab114	0.100	-2.6	NA	NA
Lab115	NA	NA	NA	NA
Lab117	NA	NA	NA	NA
Lab118	NA	NA	NA	NA
Lab119	NA	NA	NA	NA
Lab120	NA	NA	NA	NA
Lab121	NA	NA	NA	NA

APPENDIX 3. Results (mg/kg) and z-scores for FFP RSD (25 %).

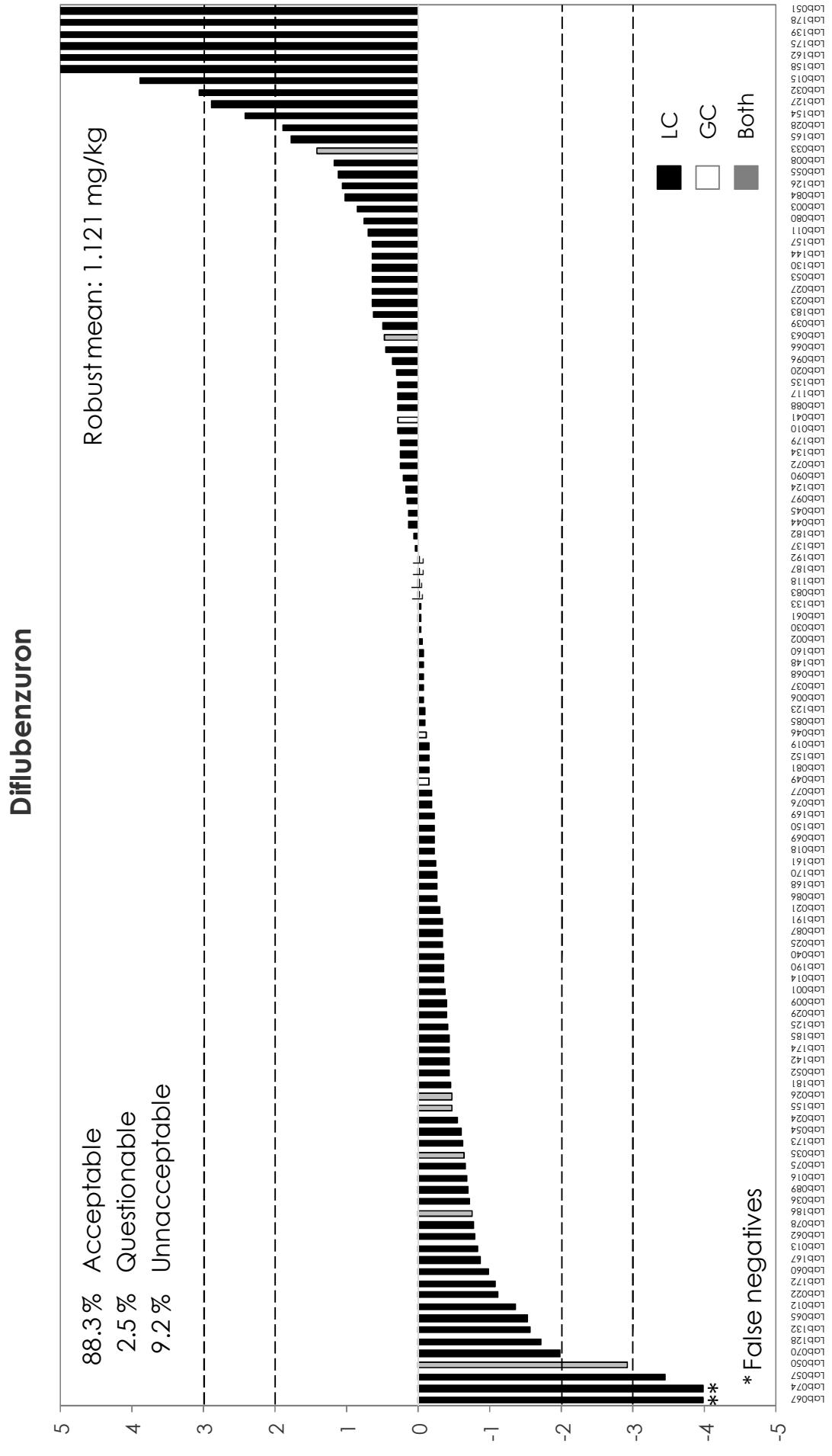
Lab Code	Cyazofamid	z score (FFP RSD 25 %)	Fenpyrazamine	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**	
Robust mean (mg/kg)	**0.279**		**0.357**	
Lab122	NA	NA	NA	NA
Lab123	0.299	0.3	NA	NA
Lab124	0.330	0.7	NA	NA
Lab125	0.239	-0.6	NA	NA
Lab126	NA	NA	NA	NA
Lab127	0.228	-0.7	0.426	0.8
Lab128	NA	NA	NA	NA
Lab129	No results reported			
Lab130	0.310	0.4	0.370	0.1
Lab131	NA	NA	NA	NA
Lab132	NA	NA	NA	NA
Lab133	0.236	-0.6	NA	NA
Lab134	0.635	5.1	NA	NA
Lab135	NA	NA	NA	NA
Lab136	NA	NA	NA	NA
Lab137	NA	NA	NA	NA
Lab138	0.260	-0.3	NA	NA
Lab139	NA	NA	NA	NA
Lab140	NA	NA	NA	NA
Lab141	NA	NA	NA	NA
Lab142	NA	NA	NA	NA
Lab143	No results reported			
Lab144	NA	NA	NA	NA
Lab145	NA	NA	NA	NA
Lab146	NA	NA	NA	NA
Lab147	NA	NA	NA	NA
Lab148	0.310	0.4	NA	NA
Lab149	NA	NA	NA	NA
Lab150	0.234	-0.6	NA	NA
Lab151	ND	-3.9	ND	-3.9
Lab152	0.241	-0.5	NA	NA
Lab153	NA	NA	NA	NA
Lab154	0.250	-0.4	NA	NA
Lab155	0.250	-0.4	NA	NA
Lab156	NA	NA	NA	NA
Lab157	0.290	0.2	NA	NA
Lab158	NA	NA	NA	NA
Lab159	NA	NA	NA	NA
Lab160	0.391	1.6	0.383	0.3
Lab161	0.220	-0.8	0.410	0.6
Lab162	0.292	0.2	NA	NA
Lab163	NA	NA	NA	NA
Lab164	NA	NA	NA	NA
Lab165	NA	NA	NA	NA
Lab166	NA	NA	NA	NA
Lab167	0.360	1.2	NA	NA
Lab168	NA	NA	NA	NA
Lab169	0.280	0.0	NA	NA
Lab170	0.320	0.6	NA	NA
Lab171	Participation cancelled			

APPENDIX 3. Results (mg/kg) and z-scores for FFP RSD (25 %).

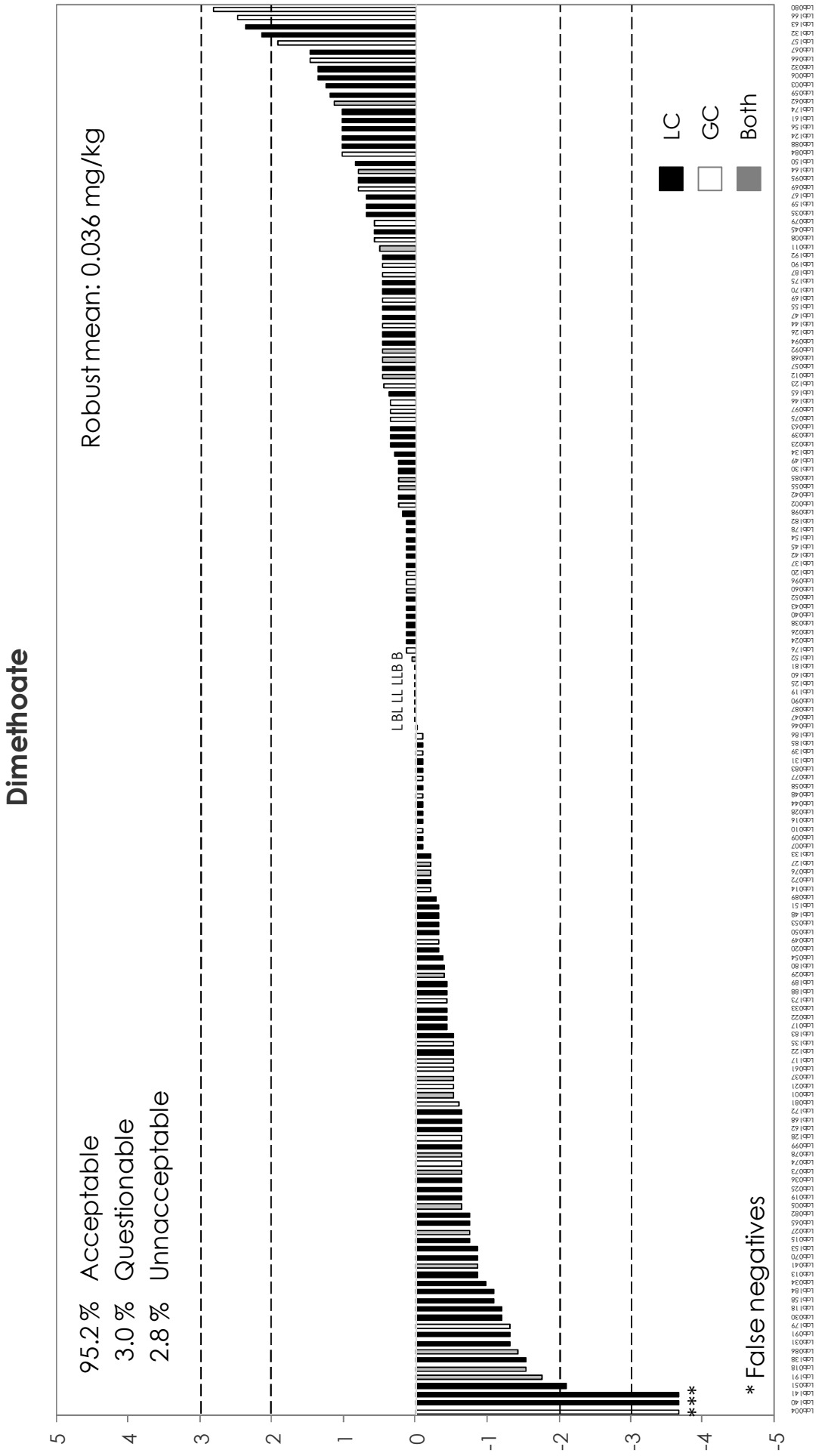
Lab Code	Cyazofamid	z score (FFP RSD 25 %)	Fenpyrazamine	z score (FFP RSD 25 %)
MRRL	**0.01**		**0.01**	
Robust mean (mg/kg)	**0.279**		**0.357**	
Lab172	0.200	-1.1	NA	NA
Lab173	0.340	0.9	0.300	-0.6
Lab174	0.230	-0.7	NA	NA
Lab175	0.330	0.7	0.380	0.3
Lab176	NA	NA	NA	NA
Lab177	NA	NA	NA	NA
Lab178	0.710	6.2	NA	NA
Lab179	0.530	3.6	NA	NA
Lab180	NA	NA	NA	NA
Lab181	0.238	-0.6	0.272	-1.0
Lab182	NA	NA	NA	NA
Lab183	NA	NA	NA	NA
Lab184	NA	NA	NA	NA
Lab185	NA	NA	NA	NA
Lab186	2.690	34.5	0.597	2.7
Lab187	0.280	0.0	NA	NA
Lab188	NA	NA	NA	NA
Lab189	NA	NA	NA	NA
Lab190	0.280	0.0	0.336	-0.2
Lab191	NA	NA	NA	NA
Lab192	0.295	0.2	NA	NA

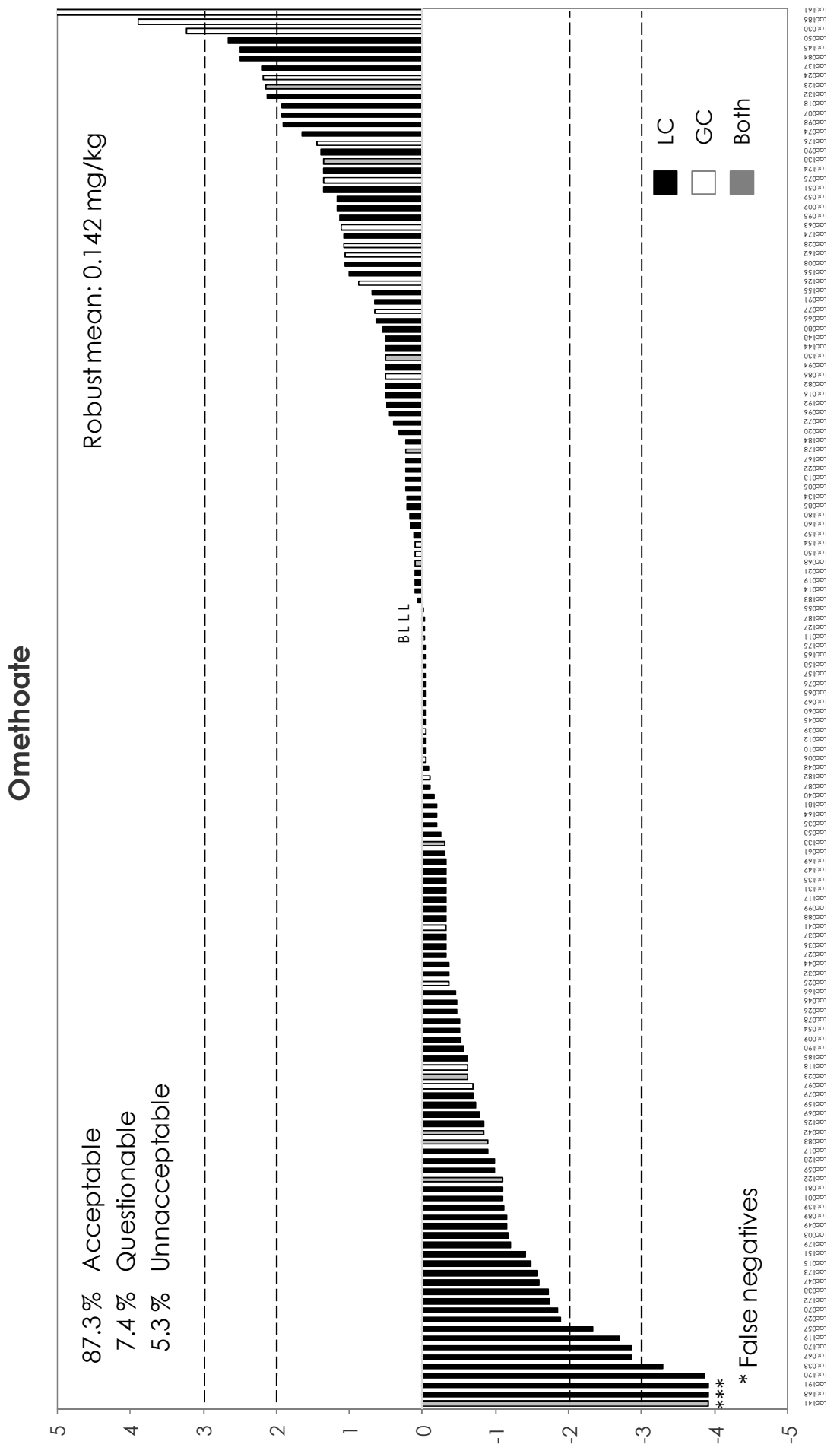

Chlorantraniliprole
Robust mean: 3.071 mg/kg
93.3 % Acceptable
1.7 % Questionable
5.0 % Unacceptable
* False negatives
LC
GC
Both
5
4
3
2
1
0
-1
-2
-3
-4
-5

APPENDIX 4. Graphical representation of z-scores for FFP RSD (25 %).

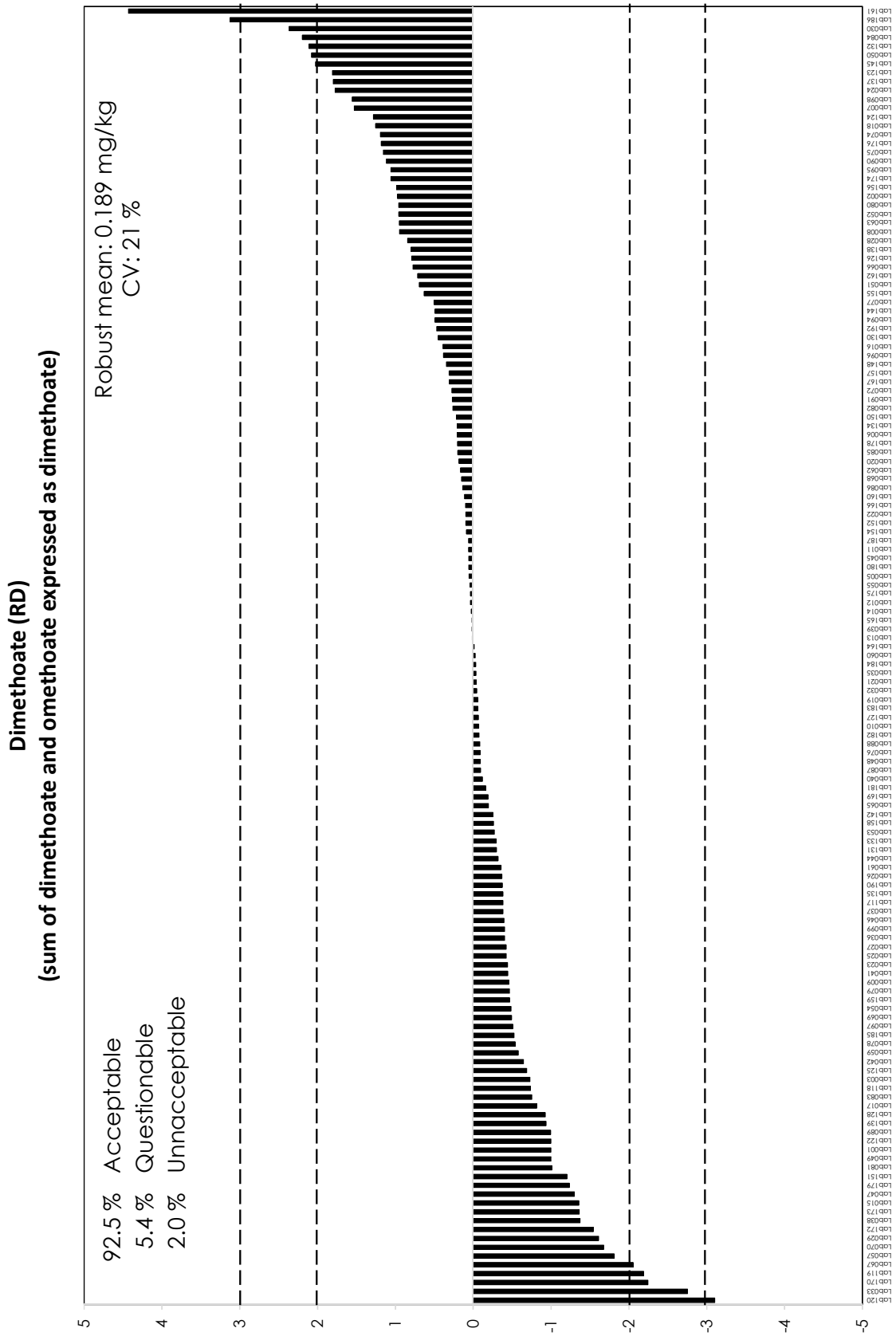

Diflubenzuron
Robust mean: 1.121 mg/kg
88.3 % Acceptable
2.5 % Questionable
9.2 % Unnacceptable
LC
GC
Both
* False negatives
5
4
3
2
1
0
-1
-2
-3
-4
-5

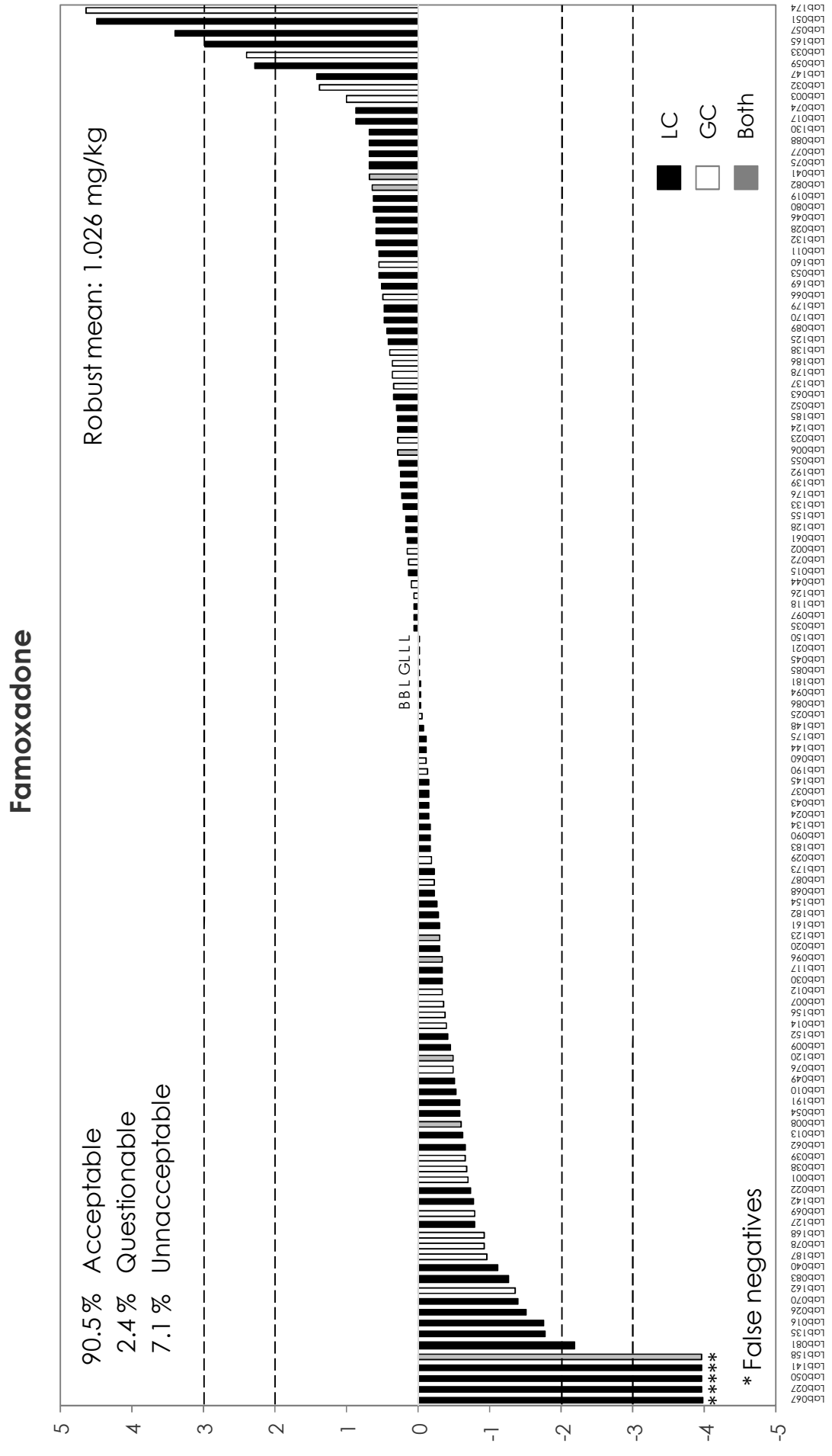
APPENDIX 4. Graphical representation of z-scores for FFP RSD (25 %).



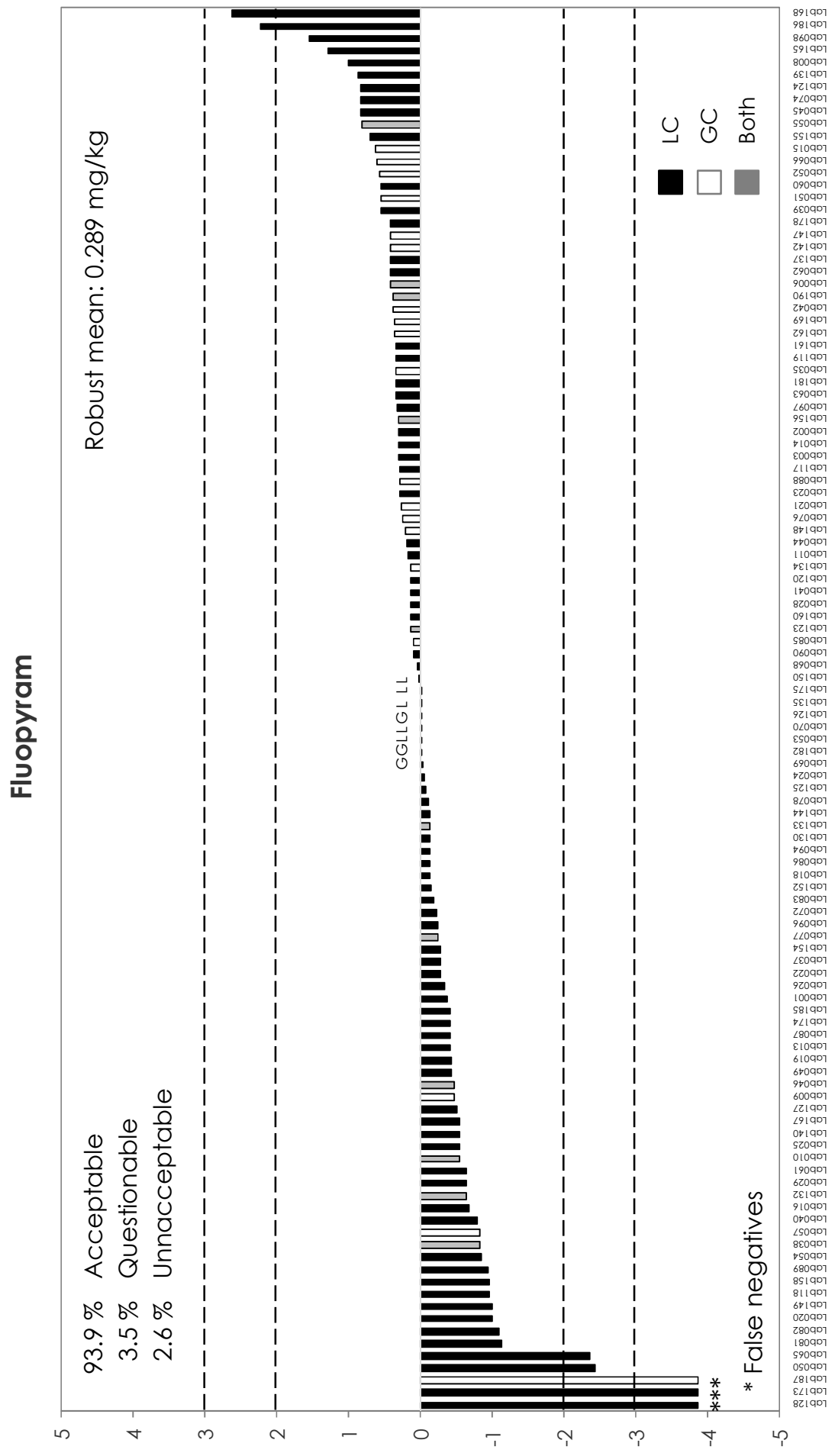

Omethoate
Robust mean: 0.142 mg/kg
87.3% Acceptable
7.4 % Questionable
5.3 % Unnacceptable
LC
GC
Both
* False negatives
5
4
3
2
1
0
-1
-2
-3
-4
-5

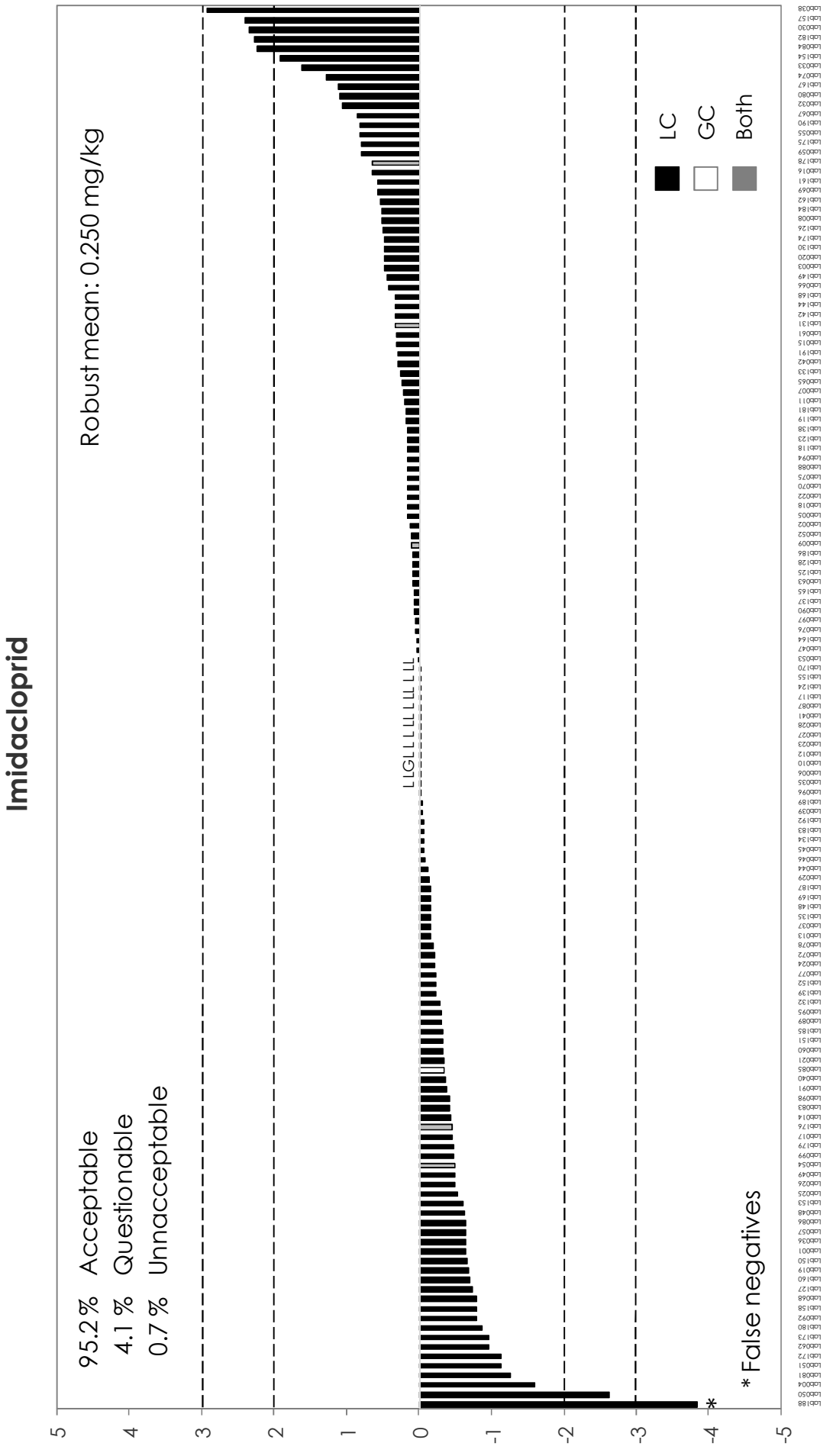
APPENDIX 4. Graphical representation of z-scores for FFP RSD (25 %).



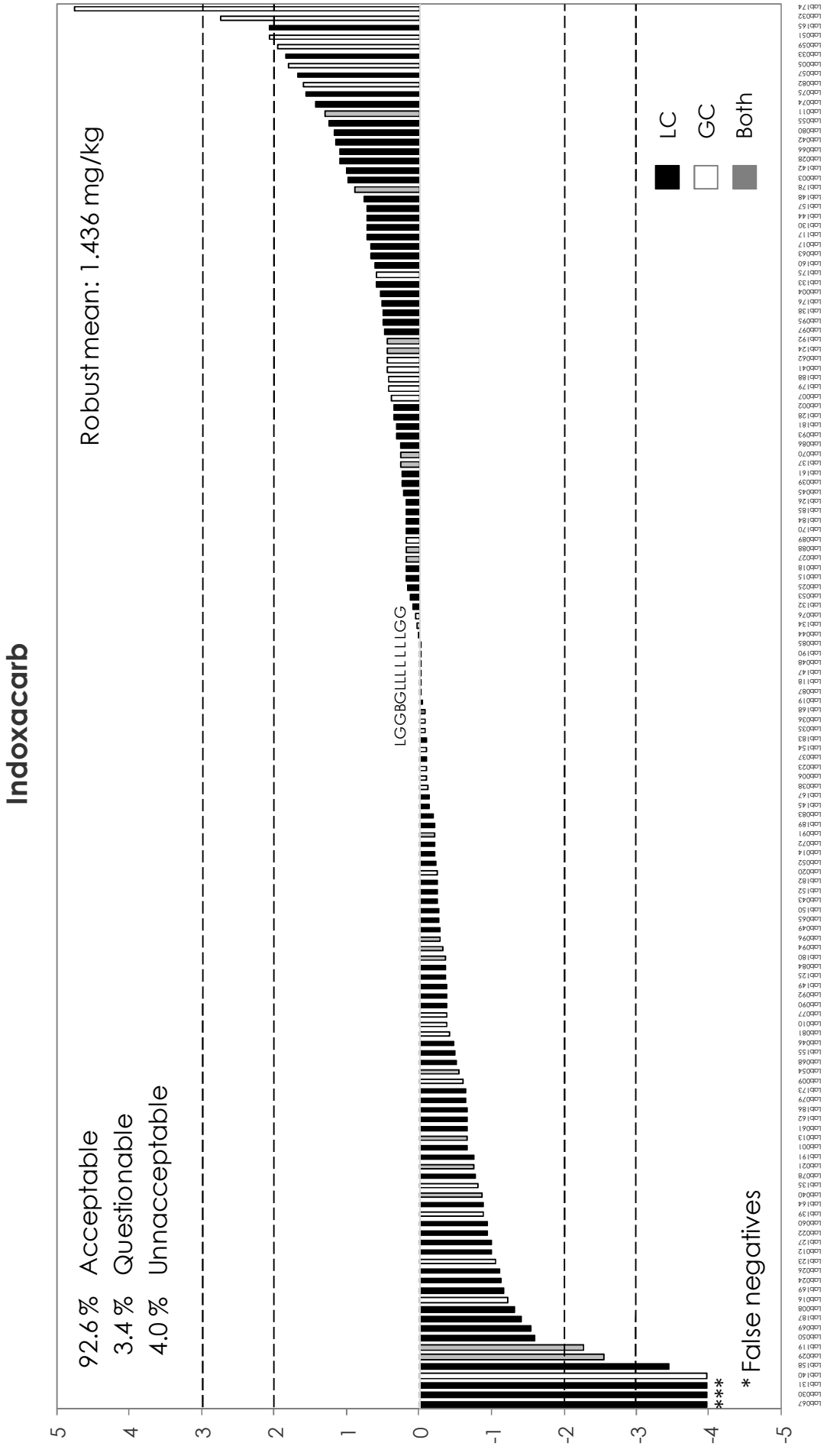

Famoxadone
Robust mean: 1.026 mg/kg
90.5 % Acceptable
2.4 % Questionable
7.1 % Unnacceptable
LC
GC
Both
* False negatives
5
4
3
2
1
0
-1
-2
-3
-4
-5

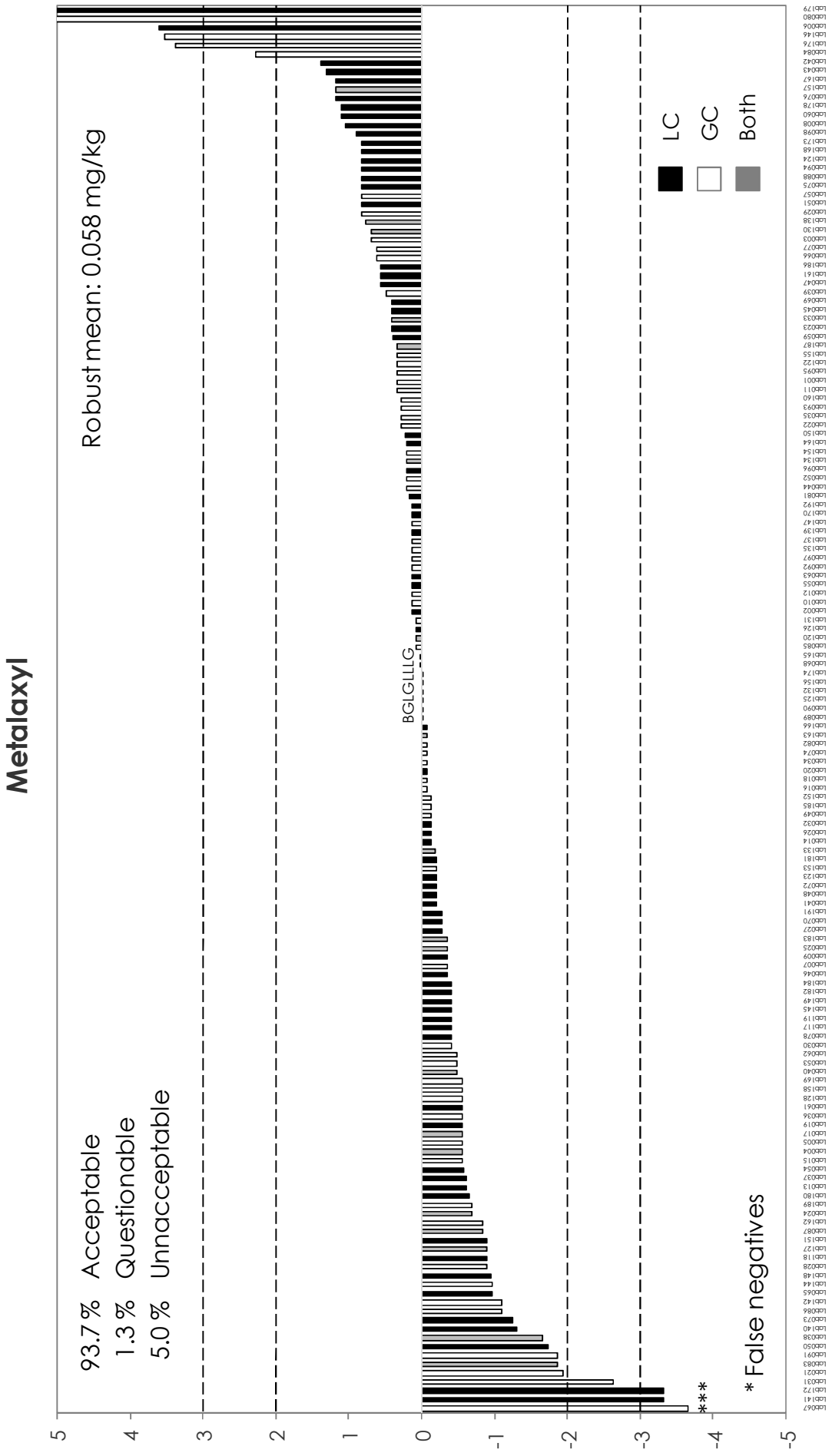
APPENDIX 4. Graphical representation of z-scores for FFP RSD (25 %).



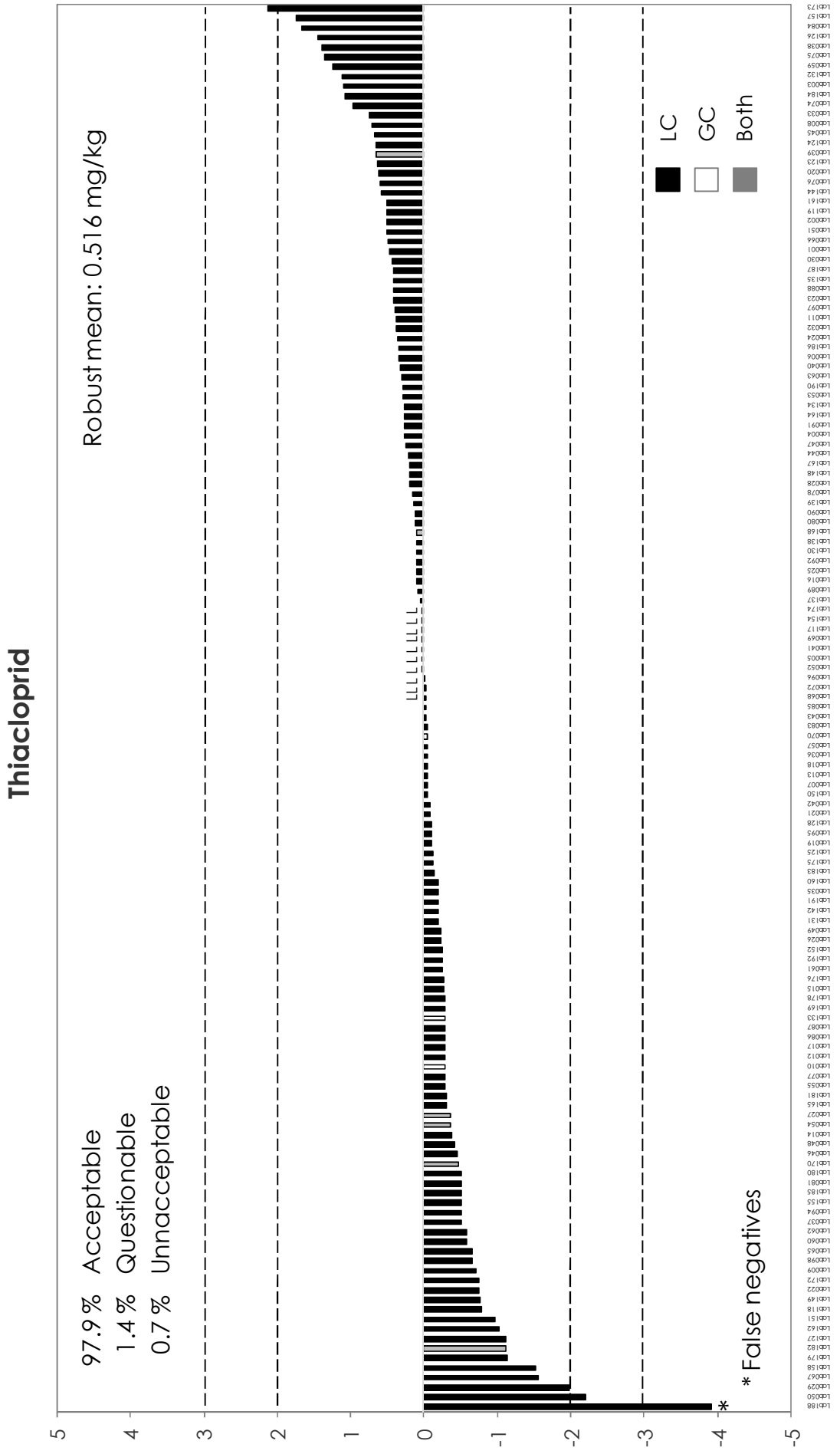

Imidacloprid
Robust mean: 0.250 mg/kg
95.2 % Acceptable
4.1 % Questionable
0.7 % Unnacceptable
LC
GC
Both
* False negatives
5
4
3
2
1
0
-1
-2
-3
-4
-5

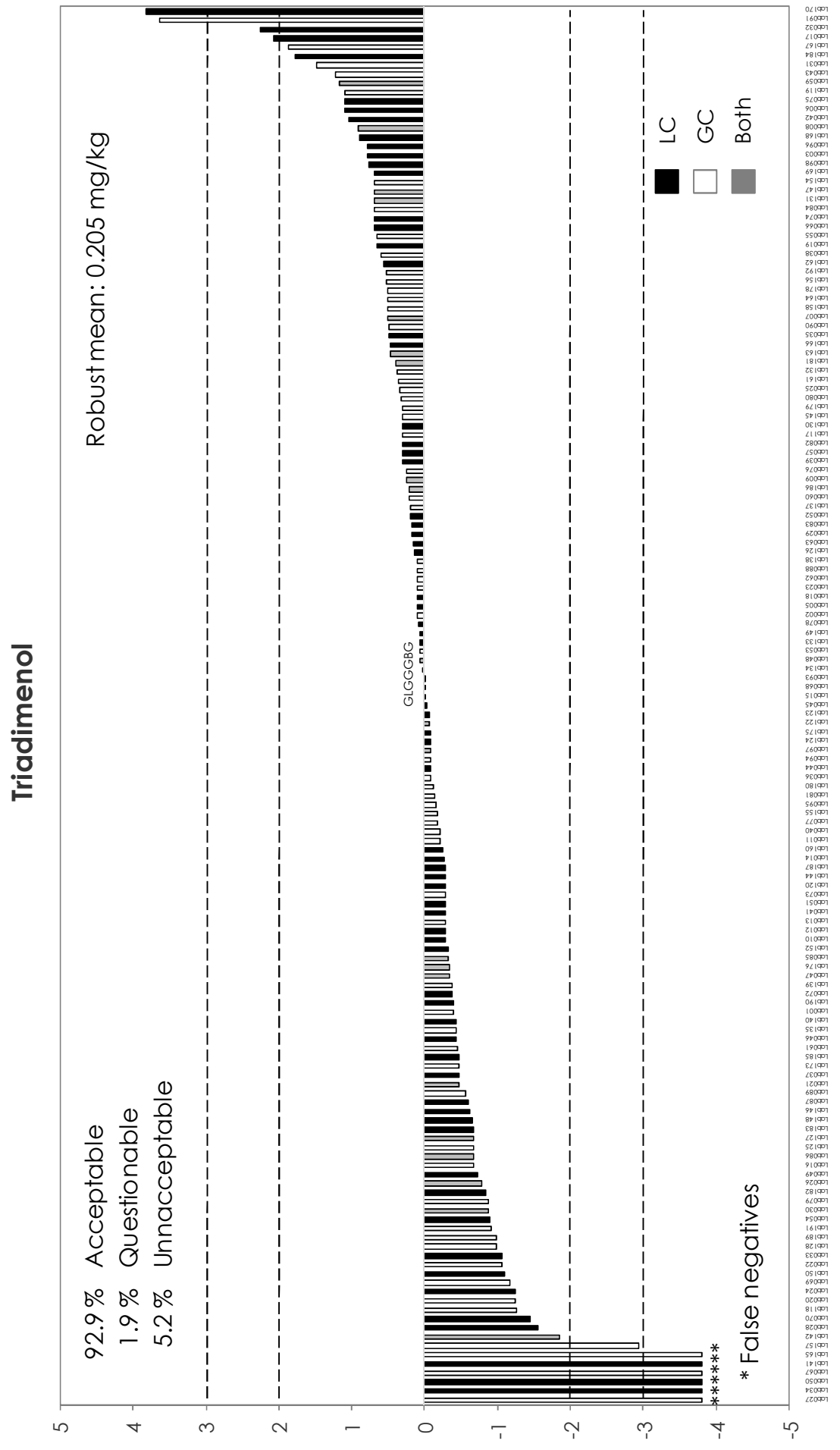
APPENDIX 4. Graphical representation of z-scores for FFP RSD (25 %).



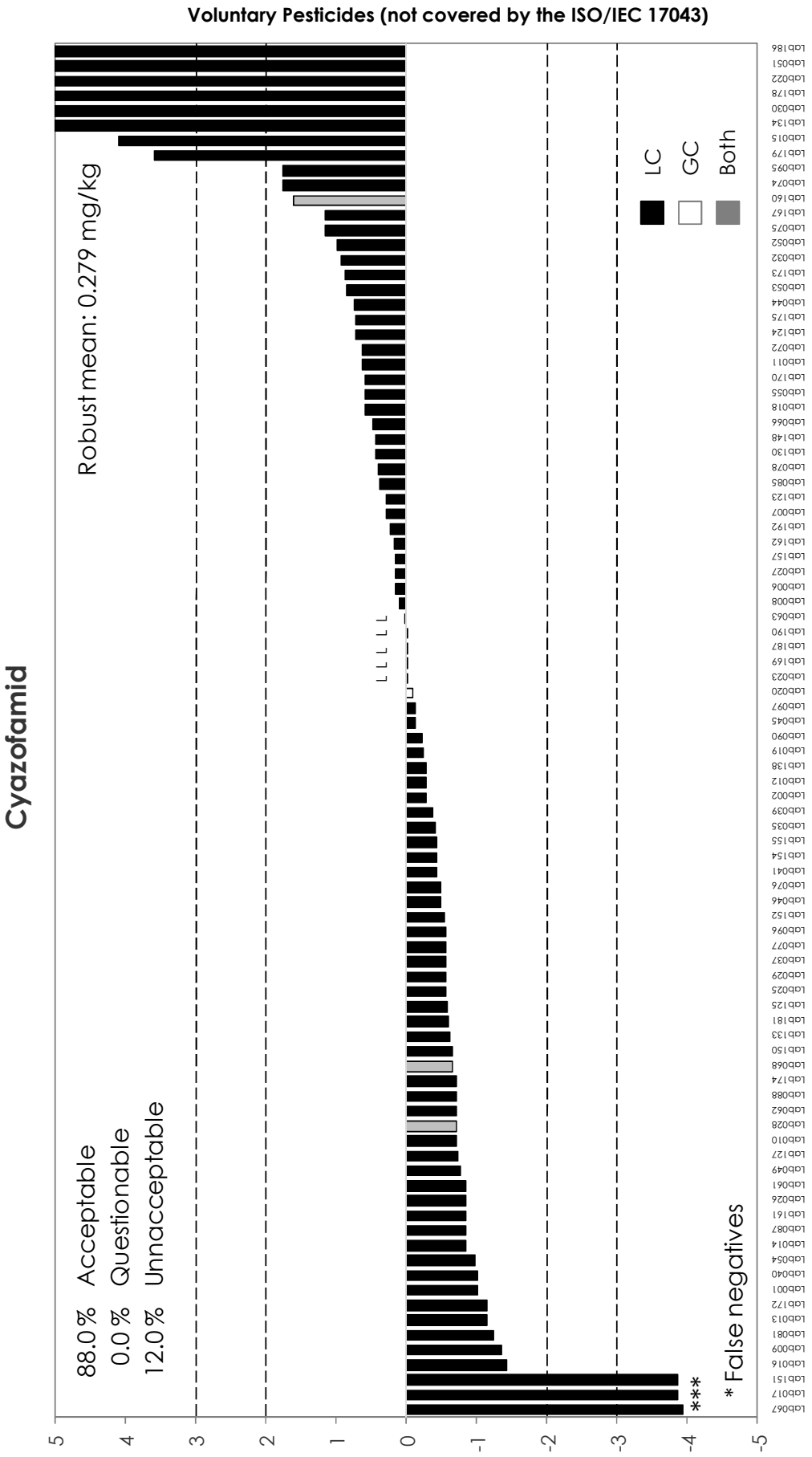

Metalaxyl
Robust mean: 0.058 mg/kg
93.7 % Acceptable
1.3 % Questionable
5.0 % Unacceptable
LC
GC
Both
BGLGLLLG
***
* False negatives
5
4
3
2
1
0
-1
-2
-3
-4
-5

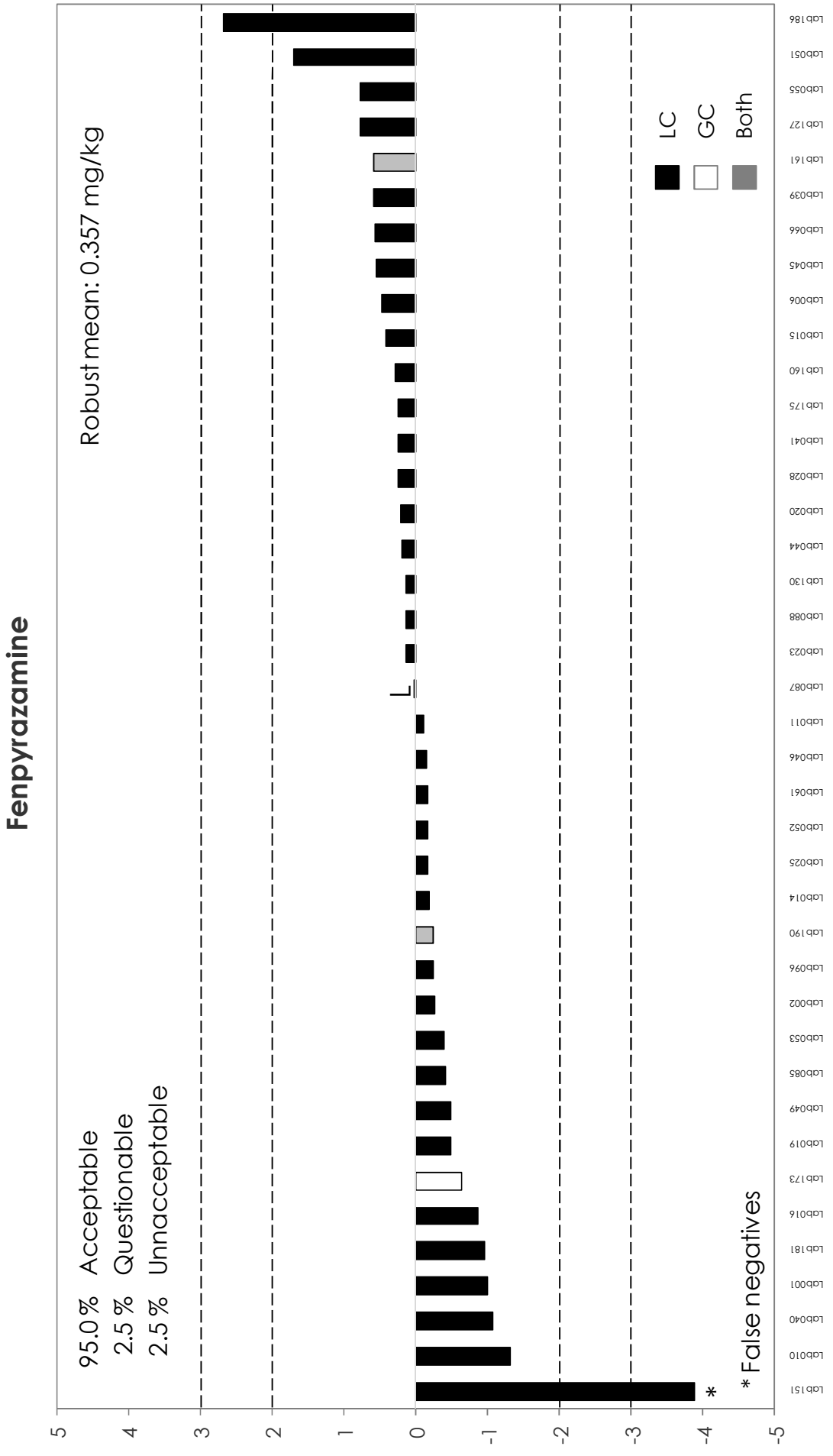
APPENDIX 4. Graphical representation of z-scores for FFP RSD (25 %).




Triadimenol
Robust mean: 0.205 mg/kg
92.9 % Acceptable
1.9 % Questionable
5.2 % Unacceptable
LC
GC
Both
* False negatives
GLGGGBG
5
4
3
2
1
0
-1
-2
-3
-4
-5

APPENDIX 4. Graphical representation of z-scores for FFP RSD (25 %).




Fenpyrazamine
Robust mean: 0.357 mg/kg
95.0 % Acceptable
2.5 % Questionable
2.5 % Unnacceptable
LC
GC
Both
* False negatives
*
L
5
4
3
2
1
0
-1
-2
-3
-4
-5
lab151
lab010
lab040
lab001
lab181
lab016
lab173
lab019
lab049
lab085
lab053
lab002
lab096
lab190
lab014
lab025
lab052
lab061
lab046
lab011
lab087
lab023
lab088
lab130
lab044
lab020
lab028
lab041
lab175
lab160
lab015
lab006
lab045
lab066
lab039
lab161
lab127
lab055
lab051
lab186

APPENDIX 5. Average of the Squared z-scores (AZ^2) for laboratories in Category A.

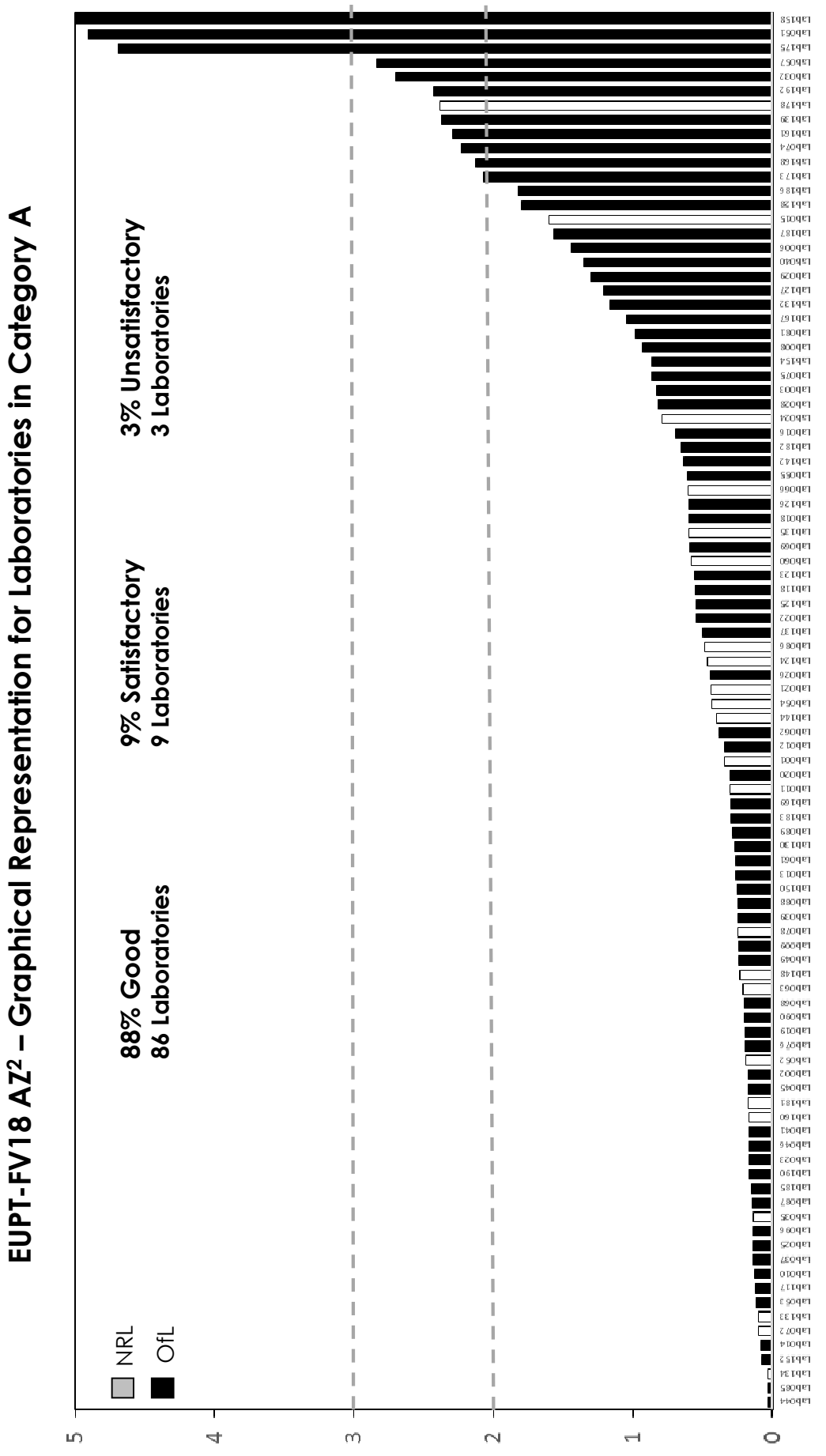
Lab Code	Chlorantraniliprole	Difenoconazole	Diflubenzuron	Dimethoate	Famoxadone	Fluopyram	Imidacloprid	Indoxacarb (sum of Indoxacarb and its R enantiomer)	Metalaxyl and metalaxyl-M	Omethoate	Thiacloprid	Triadimenol	No. of z scores	AZ^2
	z scores													
Lab001	-0.6	0.4	-0.4	-0.5	-0.7	-0.4	-0.6	-0.7	0.4	-1.1	0.5	-0.4	12	0.3
Lab002	-0.1	0.3	-0.1	0.2	0.2	0.3	0.1	0.4	0.1	1.2	0.5	0.1	12	0.2
Lab003	0.9	0.9	0.9	1.3	1.0	0.3	0.5	1.0	0.7	-1.2	1.1	0.8	12	0.8
Lab006	0.9	0.1	-0.1	1.4	0.3	0.4	0.0	-0.1	3.6	-0.1	0.3	1.1	12	1.4
Lab008	1.0	1.2	1.2	0.6	-0.6	1.0	0.5	-1.3	1.0	1.0	0.7	0.9	12	0.9
Lab009	-0.7	-0.7	-0.4	-0.1	-0.4	-0.5	0.1	-0.6	-0.3	-0.5	-0.7	0.2	12	0.2
Lab010	-0.5	-0.6	0.3	-0.1	-0.5	-0.5	0.0	-0.4	0.1	-0.1	-0.3	-0.3	12	0.1
Lab011	0.6	0.4	0.7	0.5	0.6	0.2	0.2	1.3	0.3	0.0	0.4	-0.2	12	0.3
Lab012	-0.6	-0.3	-1.4	0.5	-0.3		0.0	-1.0	0.1	-0.1	-0.3	-0.3	11	0.3
Lab013	0.1	-0.4	-0.8	-0.9	-0.6	-0.4	-0.2	-0.7	-0.6	0.2	0.0	-0.3	12	0.3
Lab014	0.0	-0.3	-0.4	-0.2	-0.4	0.3	-0.4	-0.2	-0.1	0.1	-0.4	-0.3	12	0.1
Lab015	-0.4	-0.4	3.9	-0.8	0.1	0.6	0.3	0.2	-0.6	-1.5	-0.3	0.0	12	1.6
Lab016	-0.2	-1.3	-0.7	-0.1	-1.7	-0.7	0.6	-1.2	-0.1	0.5	0.1	-0.7	12	0.7
Lab018	-0.4	-0.5	-0.2	-1.5		-0.1	0.2	0.2	-0.1	1.9	0.0	0.1	11	0.6
Lab019	-0.3	-0.1	-0.1	-0.6	0.6	-0.4	-0.7	0.0	-0.5	0.1	-0.1	0.7	12	0.2
Lab020	-0.1	0.3	0.3	-0.3	-0.3	-1.0	0.5	-0.2	-0.1	0.3	0.6	-1.2	12	0.3
Lab021	0.0	-0.5	-0.3	-0.5	0.0	0.3	-0.3	-0.7	-1.9	0.1	-0.1	-0.5	12	0.4
Lab022	-1.3	-0.5	-1.1	-0.4	-0.7	-0.3	0.2	-0.9	0.3	0.2	-0.7	-1.1	12	0.5
Lab023	0.7	0.2	0.6	0.4	0.3	0.3	0.0	-0.1	0.4	-0.6	0.4	0.1	12	0.2
Lab024	-0.6	-0.8	-0.5	0.1	-0.2	0.0	-0.2	-1.1	-0.7	2.2	0.3	-1.2	12	0.8
Lab025	0.0	0.3	-0.3	-0.6	0.0	-0.5	-0.5	0.2	-0.3	-0.4	0.1	0.3	12	0.1
Lab026	0.1	-0.6	-0.5	0.1	-1.5	-0.3	-0.5	-1.1	-0.1	-0.5	-0.2	-0.8	12	0.4
Lab028	-0.4	-0.4	1.9	-0.1	0.6	0.1	0.0	1.1	-0.9	1.1	0.2	-1.6	12	0.8
Lab029	0.2	-0.3	-0.4	-0.4	-0.2	-0.6	-0.1	-2.6	0.8	-1.9	-2.0	0.2	12	1.3
Lab032	1.5	0.6	3.1	1.4	1.4		1.1	2.7	-0.1	-0.4	0.4	2.3	11	2.7
Lab035	0.5	0.1	-0.6	0.7	0.1	0.4	0.0	-0.1	0.3	-0.2	-0.2	0.5	12	0.1
Lab037	-0.4	0.3	-0.1	-0.5	-0.1	-0.3	-0.2	-0.1	-0.6	-0.3	-0.5	-0.5	12	0.1
Lab039	0.4	0.9	0.5	0.4	-0.6	0.6	0.0	0.2	0.5	-0.1	0.6	0.3	12	0.2
Lab040	-3.4	-1.2	-0.3	0.1	-1.1	-0.8	-0.4	-0.9	-0.5	-0.2	0.3	-0.2	12	1.3
Lab041	0.0	0.5	0.3	-0.9	0.7	0.1	0.0	0.5	-0.2	-0.3	0.0	-0.3	12	0.2
Lab044	-0.1	0.2	0.1	-0.1	0.1	0.2	-0.1	0.0	0.2	-0.4	0.2	-0.1	12	0.0
Lab045	0.1	0.5	0.1	0.6	0.0	0.8	-0.1	0.2	0.4	-0.1	0.7	0.0	12	0.2
Lab046	-0.5	-0.4	-0.1	0.0	0.6	-0.5	-0.1	-0.5	-0.4	-0.5	-0.5	-0.4	12	0.2
Lab049	0.0	-0.2	-0.1	-0.3	-0.5	-0.4	-0.5	-0.3	-0.1	-1.2	-0.2	-0.7	12	0.2
Lab051	0.7	-0.1	5.0	-2.1	4.5	0.6	-1.1	2.1	0.8	1.4	0.5	-0.3	12	4.9
Lab052	0.3	0.1	-0.4	0.1	0.3	0.6	0.1	-0.2	0.2	1.2	0.0	0.2	12	0.2
Lab053	-0.4	0.0	0.6	-0.3	0.6	0.0	0.0	0.1	-0.5	-0.2	0.3	0.1	12	0.1
Lab054	-0.9	-0.9	-0.6	-0.4	-0.6	-0.8	-0.5	-0.5	-0.6	-0.5	-0.4	-0.9	12	0.4
Lab055	1.1	1.1	1.1	0.2	0.3	0.8	0.8	1.3	0.1	0.0	-0.3	0.7	12	0.6
Lab057	-0.4	0.3	-3.4	0.5	3.4	-0.8	-0.6	1.7	0.8	-2.3	0.0	0.3	12	2.8
Lab060	1.6	-0.7	-1.0	0.1	-0.1	0.6	-0.3	-0.9	1.1	-0.1	-0.6	0.2	12	0.6
Lab061	-1.1	-0.2	0.0	-0.5	0.2	-0.6	0.3	-0.7	-0.5	-0.3	-0.3	-0.5	12	0.3
Lab062	0.3	-0.5	-0.8	1.1	-0.6	0.4	-1.0	0.5	-0.5	-0.1	-0.6	0.1	12	0.4
Lab063	0.2	0.3	0.5	0.4	0.3	0.3	0.1	0.7	0.1	1.1	0.3	0.1	12	0.2
Lab066	0.2	1.1	0.5	1.5	0.5	0.6	0.4	1.1	0.6	0.6	0.5	0.7	12	0.6
Lab068	-1.1	-0.2	-0.1	0.5	-0.2	0.0	-0.8	-0.5	0.0	0.1	0.0	0.0	12	0.2

APPENDIX 5. Average of the Squared z-scores (AZ^2) for laboratories in Category A.

Lab Code	Chlorantraniliprole	Difenoconazole	Diflubenzuron	Dimethoate	Famoxadone	Fluopyram	Imidacloprid	Indoxacarb (sum of indoxacarb and its R enantiomer)	Metalaxyl and metalaxyl-M	Omethoate	Thiacloprid	Triadimenol	No. of z scores	AZ^2
	z scores													
Lab069	0.2	-0.9	-0.2	0.8	-0.8	0.0	0.6	-1.5	0.4	-0.8	0.0	-1.2	12	0.6
Lab072	0.6	-0.4	0.2	-0.2	0.1	-0.2	-0.2	-0.2	-0.2	0.4	0.0	-0.4	12	0.1
Lab074	1.0	0.6	-4.0	-0.6	0.9	0.8	1.3	1.4	-0.1	1.6	1.0	0.7	12	2.2
Lab075	0.2	0.6	-0.6	0.4	0.7		0.2	1.6	0.8	1.4	1.3	1.1	11	0.9
Lab076	0.0	0.3	-0.2	-0.2	-0.5	0.3	0.1	0.1	1.2	-0.1	0.6	0.2	12	0.2
Lab078	0.0	0.0	-0.8	-0.6	-0.9	-0.1	-0.2	-0.8	-0.4	-0.5	0.2	0.1	12	0.2
Lab081	-0.4	-1.4	-0.1	-0.6	-2.2	-1.1	-1.2	-0.4	0.2	-1.1	-0.5	-0.1	12	1.0
Lab085	-0.1	0.1	-0.1	0.2	0.0	0.1	-0.3	0.0	0.1	0.2	0.0	-0.3	12	0.0
Lab086	-1.0	-0.5	-0.3	-1.4	0.0	-0.1	-0.6	0.3	-1.1	0.5	-0.3	-0.7	12	0.5
Lab087	-0.2	0.4	-0.3	0.0	-0.2	-0.4	0.0	0.0	-0.8	-0.1	-0.3	-0.6	12	0.1
Lab088	0.4	0.3	0.3	1.0	0.7	0.3	0.2	0.2	0.8	-0.3	0.4	0.1	12	0.2
Lab089	-0.1	0.1	-0.7	-0.3	0.4	-0.9	-0.3	0.2	0.0	-1.2	0.1	-0.6	12	0.3
Lab090	0.0	-0.1	0.2	0.0	-0.2	0.1	0.1	-0.4	0.0	1.4	0.1	0.5	12	0.2
Lab096	0.6	0.0	0.4	0.1	-0.3	-0.2	0.0	-0.3	0.2	0.5	0.0	0.8	12	0.1
Lab108	-1.9	0.3	-0.6	-0.4		-0.4	0.0	-0.8	0.1	-0.5	-0.8	0.1	11	0.5
Lab109	-0.6	0.0	0.4	-0.6		-0.3	-0.6	0.2	-0.5	-0.5	-0.6	-0.9	11	0.3
Lab110	-0.4	-0.4	0.6	0.4	-0.2	-0.5	-0.3	-0.4	3.6	-0.6	0.1	-0.3	12	1.2
Lab111		0.4	0.9	-0.1	0.9	-0.3	-0.3	0.0	-0.5	-0.5	0.1	1.5	11	0.4
Lab115	-0.7	0.1	0.2	0.8	1.4	0.4	-0.2	-0.4	0.1	-0.6	-0.4	0.2	12	0.3
Lab117	-0.1	0.0	0.3	-0.5	-0.3	0.3	0.0	0.7	-0.4	-0.3	0.0	0.3	12	0.1
Lab118	-0.2	-0.9	0.0	-1.2	0.1	-1.0	0.2	0.0	-0.9	-0.6	-0.8	-1.3	12	0.6
Lab123	0.0	-0.4	-0.1	0.4	-0.3	0.1	0.2	-1.0	-0.2	2.1	0.6	-0.1	12	0.6
Lab124	0.2	0.7	0.2	1.0	0.3	0.8	0.0	0.5	0.8	1.4	0.6	-0.1	12	0.5
Lab125	-1.1	1.9	-0.4	0.0	0.4	-0.1	0.1	-0.4	0.0	-0.8	-0.1	-0.7	12	0.5
Lab126	0.2	1.6	1.1	0.5	0.1	0.0	0.5	0.2	0.1	0.9	1.4	0.1	12	0.6
Lab127	-0.8	-0.8	2.9	-0.2	-0.8	-0.5	-0.7	-1.0	-0.9	0.0	-1.1	-0.7	12	1.2
Lab128	0.9	-0.4	-1.7	-0.6	0.2	-3.9	0.1	0.3	-0.5	-1.0	-0.1	-1.0	12	1.8
Lab130	0.0	0.8	0.6	0.2	0.7	-0.1	0.5	0.7	0.7	0.5	0.1	0.3	12	0.3
Lab132	0.5	-0.1	-1.6	2.1	0.6	-0.6	-0.3	0.1	0.0	2.1	1.1	0.4	12	1.2
Lab133	-0.5	-0.4	0.0	-0.2	0.2	-0.1	0.3	0.6	-0.2	-0.3	-0.3	0.1	12	0.1
Lab134	-0.1	0.2	0.2	0.3	-0.2	0.1	-0.1	0.0	0.2	0.2	0.3	0.0	12	0.0
Lab135	1.5	-0.4	0.3	-0.5	-1.8	0.0	-0.2	-0.8	0.1	-0.3	0.4	-0.4	12	0.6
Lab137		0.5	0.0	0.1	0.3	0.4	0.1	0.3	0.1	2.2	0.0	0.2	11	0.5
Lab139	-0.1	-0.5	5.0	-0.1	0.2	0.9	-0.2	-0.9	0.1	-1.1	0.1	-0.4	12	2.4
Lab142	0.4	-0.7	-0.4	0.1	-0.8	0.4	0.3	1.0	-1.1	-0.3	-0.2	-1.8	12	0.6
Lab144	-0.6	1.3	0.6	0.5	-0.1	-0.1	0.3	0.7	-1.0	0.5	0.6	-0.3	12	0.4
Lab148	-0.6	0.0	-0.1	-0.3	-0.1	0.2	-0.2	0.8	-0.9	0.5	0.2	-0.7	12	0.2
Lab150	-0.5	-0.5	-0.2	0.8	0.0	0.0	-0.7	-0.3	0.2	0.1	-0.1	-1.1	12	0.3
Lab152	-0.5	-0.4	-0.1	0.1	-0.4	-0.1	-0.2	-0.2	-0.1	0.1	-0.2	-0.3	12	0.1
Lab154	0.0	-0.3	2.4	0.1	-0.3	-0.3	1.9	-0.1	0.2	0.1	0.0	0.7	12	0.9
Lab158	-1.3	1.3	5.0	-1.1	-4.0	-1.0	-0.8	-3.4	-0.5	-0.1	-1.5	0.5	12	5.1
Lab160	0.8	0.0	-0.1	0.0	0.6	0.1	-0.7	0.6	0.3	0.1	-0.2	-0.2	12	0.2
Lab161	-0.3	0.2	-0.2	1.0	-0.3	0.4	0.6	0.2	0.6	5.0	0.5	0.4	12	2.3
Lab167	-1.9	0.2	-0.9	0.7		-0.5	1.1	-0.1	1.2	0.2	0.2	1.9	11	1.0
Lab168	-0.4	0.2	-0.3	-0.6	-0.9	2.6	0.3	-0.1	0.8	-3.9	0.1	0.9	12	2.1
Lab169	-0.7	0.1	-0.2	0.5	0.5	0.4	-0.2	-1.2	-0.5	-0.3	-0.3	0.7	12	0.3
Lab173	-0.1	-0.3	-0.6	-0.4	-0.2	-3.9	-1.0	-0.6	0.8	-1.6	2.1	-0.5	12	2.1

APPENDIX 5. Average of the Squared z-scores (AZ^2) for laboratories in Category A.

Lab Code	Chlorantraniliprole	Difenoconazole	Diflubenzuron	Dimethoate	Famoxadone	Fluopyram	Imidacloprid	Indoxacarb (sum of indoxacarb and its R enantiomer)	Metalaxyl and metalaxyl-M	Omethoate	Thiacloprid	Triadimenol	No. of z scores	AZ^2
	z scores													
Lab175	5.0	-0.6	5.0	0.5	-0.1	0.0	0.8	0.6		-0.1	-0.1	-0.1	11	4.7
Lab178	0.3	0.6	5.0	0.1	0.4	0.4	0.6	0.9	1.1	0.2	-0.3	0.5	12	2.4
Lab181	-1.1	0.4	-0.4	0.0	0.0	0.3	0.2	0.3	-0.2	-0.2	-0.3	0.4	12	0.2
Lab182	-0.4	-0.4	0.1	0.1	-0.3	0.0	2.3	-0.2	-0.4	-0.1	-1.1	-0.8	12	0.7
Lab183	-1.3	-0.5	0.6	-0.5	-0.2		-0.1	-0.1	-0.3	0.1	-0.1	-0.7	11	0.3
Lab185	0.6	-0.1	-0.4	-0.1	0.3	-0.4	-0.3	0.2	-0.1	-0.6	-0.5	-0.5	12	0.1
Lab186	-0.2	0.1	-0.7	-0.1	0.4	2.2	0.1	-0.7	0.6	3.9	0.3	0.2	12	1.8
Lab187	0.6	0.2	0.0	0.5	-1.0	-3.9	-0.2	-1.4	0.4	0.0	0.4	-0.3	12	1.6
Lab190	0.3	0.0	-0.3	0.5	-0.1	0.4	0.8	0.0		-0.6	0.3	-0.4	11	0.2
Lab192	5.0	0.8	0.0	0.5	0.2		-0.1	0.5	0.1	0.5	-0.3	0.5	11	2.4


EUPT-FV18 AZ² – Graphical Representation for Laboratories in Category A
88% Good
86 Laboratories
9% Satisfactory
9 Laboratories
3% Unsatisfactory
3 Laboratories
NRL
OfL
5
4
3
2
1
0

ANNEX 1. Protocols and Target list of pesticides to be sought.

6th Edition
Revised: February 2016

GENERAL PROTOCOL for EU Proficiency Tests for Pesticide Residues in Food and Feed

Introduction
This protocol contains general procedures valid for all European Union Proficiency Tests (EUPTs) organised on behalf of the European Commission, DG-SANTE[7] by the four European Union Reference Laboratories (EURLs) responsible for pesticide residues in food and feed. These EUPTs are directed at laboratories belonging to the Network[8] of National Reference Laboratories (NRLs) and Official Laboratories (OfLs) of the EU Member States. OfLs from EFTA countries and EU-Candidate countries are also welcome to participate in the EUPTs. OfLs from Third countries may be permitted to participate on a case-by-case basis.

The following four EURLs for pesticide residues were appointed by DG-SANTE based on regulation 882/2004/EC[9]:

- EURL for Fruits and Vegetables (EURL-FV),
- EURL for Cereals and Feedingstuffs (EURL-CF),
- EURL for Food of Animal Origin and Commodities with High Fat Content (EURL-AO) and
- EURL for pesticides requiring Single Residue Methods (EURL-SRM).

The aim of these EUPTs is to obtain information regarding the quality, accuracy and comparability of pesticide residue data in food and feed reported to the European Union within the framework of the national control programmes and the EU multiannual co-ordinated control programme[10]. Participating laboratories will be provided with an assessment of their analytical performance that they can use to demonstrate their analytical performance and compare themselves with other participating laboratories.

EUPT-Organizers and Scientific Committee
EUPTs are organised by individual EURLs, or by more than one EURL, in joint collaboration.
An **Organising Team** is appointed by the EURL(s) in charge. This team is responsible for all administrative and technical matters concerning the organisation of the PT, e.g. the PT-announcement, production of Test Item and Blank Material, the undertaking of homogeneity and stability tests, packing and shipment of the Test Item and Blank Material, handling and evaluation of the results and method information submitted by the participants and the drafting of the preliminary and final reports.

To complement the internal expertise of the EURLs, a group of external consultants that form the **EUPT-Scientific Committee** (EUPT-SC)[11] has been established and approved by DG-SANTE. The EUPT-SC consists of expert scientists with many years of experience in PTs and/or pesticide residue analysis. The actual composition of the EUPT-SC, the affiliation of each member is shown on the EURL-Website. The members of the EUPT-SC will also be listed in the Specific Protocol and the Final Report of each EUPT.
The EUPT-SC is made up of the following two subgroups:

a) An independent **Quality Control Group** (EUPT-QCG) and
b) An **Advisory Group** (EUPT-AG).

The EUPT-SC's role is to help the Organisers make decisions regarding the EUPT design: the selection of the commodity, the selection of pesticides to be included in the Target Pesticide List (see below), the establishment of the Minimum Required Reporting Levels (MRRLs), the statistical treatment and evaluation of participants results (in anonymous form), and the drafting and updating of documents such as the General and Specific PT Protocols and the Final EUPT-Reports.
The EUPT-QCG has the additional function of supervising the quality of EUPTs and of assisting the EURLs in confidential aspects such as the choice of the pesticides to be present in the Test Item and the concentrations at which they should be present.

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[7] DG-SANTE = European Commission, Health and Food Safety Directorate-General

[8] For more information about the EURL/NRL/OfL-Network please refer to the EURL-Web-portal under: http://www.eurl-pesticides.eu

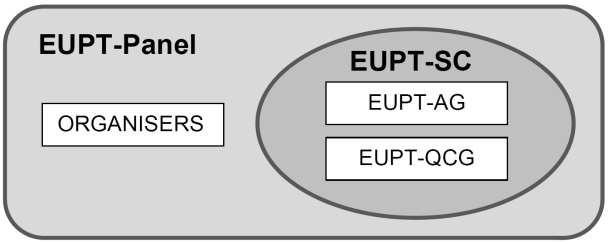
[9] Regulation (EC) No 882/2004 of the European Parliament and of the Council on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules. Published at OJ of the EU L191 of 28.05.2004

[10] European Commission Proficiency Tests for Pesticide Residues in Fruits and Vegetables, Trends in Analytical Chemistry, 2010, 29 (1), 70 – 83.

[11] Link to the List of current members of the EUPT Scientific Committee: http://www.eurl-pesticides.eu/library/docs/allcrl/EUPT-SC.pdf

The EUPT-SC typically meets once a year, after the EUPTs of all four pesticide EURLs have been conducted, to discuss the evaluation of the EUPT-results and to consult with the EURLs in their decision making. Upcoming EUPTs are also planned during these meetings.

The EUPT-Organising Team and the EUPT-SC together form the **EUPT-Panel**.



The decisions of the EUPT-Panel will be documented.

This present EUPT General Protocol was jointly drafted by the EUPT-SC and the EURLs and was approved by DG-SANTE.

EUPT Participants
Within the European Union all NRLs operating in the same area as the organising EURL, as well as all OfLs whose scope overlaps with that of the EUPT, are legally obliged to participate in EUPTs. The legal obligation of NRLs and OfLs to participate in EUPTs arises from:

- Art. 28 of Reg. 396/2005/EC[12] (for all OfLs analysing for pesticide residues within the framework of official controls[13] of food or feed)
- Art. 33 of Reg. 882/2004/EC (for all NRLs)

The four EURLs will annually issue and distribute, via the EURL-website, a joint list of all OfLs that must participate in each of the EUPTs to be conducted within a given year. The list of obliged labs will be updated every year to take account of any changes in the lab profiles. Interim updates will be issued to eliminate any possible errors.

NRLs are responsible for checking whether all relevant OfLs within their network are included in the list of obligated laboratories and whether the contact information and commodity-scopes are correct.
OfLs are furthermore urged to keep their own profiles within the EURL-DataPool up-to-date, especially their commodity and pesticide scopes and their contact information.

Labs that are obliged to participate in a given EUPT, and that are not able to participate, must provide the reasons for their non-participation without prejudice of any legal action taken against them for not participating. This also applies to any participating laboratories that then fail to report results.

Confidentiality and Communication
The proprietor of all EUPT data is DG-SANTE and as such has access to all information.

For each EUPT, the laboratories are given a unique code (lab code), initially only known to themselves and the Organisers. In the final EUPT-Report, the names of participating laboratories will not be linked to their laboratory codes. It should be noted, however, that the Organisers, at the request by DG-SANTE, may present the EUPT-results on a country-by-country basis. It may therefore be possible that a link between codes and laboratories could be made, especially for those countries where only one laboratory has participated. Furthermore, the EURLs reserve the right to share EUPT results and codes amongst themselves: for example, for the purpose of evaluating overall lab or country performance as requested by DG-SANTE.

As laid down in Regulation 882/2004, NRLs are responsible for evaluating and improving their own OfL-Network. On request from the NRLs, the EURLs will provide them with the PT-codes of the participating OfLs belonging to their OfL-Network. This will allow NRLs to follow the participation and performance of the laboratories within their network.
Communication between participating laboratories during the test on matters concerning a PT exercise is not permitted from the start of the PT exercise until the distribution of the preliminary report.
For each EUPT the organising EURL prepares a specific EUPT-Website where all relevant documents in their latest version are linked.

[12] Regulation (EC) No 396/2005, published at OJ of the EU L70 of 16.03.2005, as last amended by Regulation 839/2008 published at OJ of the EU L234 of 30.08.2008.
[13] Official controls in the sense of Reg. 882/2004/EC, this includes labs involved in controls within the framework of national and/or EU-controlled programmes as well as labs involved in import controls according to Regulation 669/2009/EC.

ANNEX 1. Protocols and Target list of pesticides to be sought.

The official language used in all EUPTs is English.

Announcement / Invitation Letter

At least 3 months before the distribution of the Test Item the EURLs will publish an Announcement/Invitation letter on the EURL-web-portal and distribute it via e-mail to the NRL/OfL mailing list available to the EURLs. This letter will inform about the commodity to be used as Test Item, as well as links to the tentative EUPT-Target Pesticide List and the tentative EUPT-Calendar.

Target Pesticide List

This list contains all analytes (pesticides and metabolites) to be sought, along with the Minimum Required Reporting Levels (MRRLs) valid for the specific EUPT. The MRRLs are typically based upon the lowest MRLs found either in Regulation 396/2005/EC or Commission Directive 2006/125/EC (Baby Food Directive).

Labs must express their results as stated in the Target Pesticides List.

Specific Protocol

For each EUPT the organizing EURL will publish a Specific Protocol at least 2 weeks before the Test Item is distributed to the participating laboratories. The Specific Protocol will contain all the information previously included in the Invitation Letter but in its final version, information on payment and delivery, instructions on how to handle the Test Item upon receipt and on how to submit results, as well as any other relevant information.

Homogeneity of the Test Item

The Test Item will be tested for homogeneity typically before distribution to participants. The homogeneity tests involve the analysis of two replicate analytical portions, taken from at least ten randomly chosen units of treated Test Item. Both sample preparation and measurements should be conducted in random order.

The homogeneity test data are statistically evaluated according to the International Harmonized Protocols published by ISO and IUPAC. The acceptance criterion for the Test Items to be sufficiently homogeneous for the Proficiency Test is that s_{sam}^2 is less than c with s_{sam} being the between-bottle sampling standard deviation and $c = F_1 \times \sigma_{all}^2 + F_2 \times s_{an}^2$. F_1 and F_2 are constants, with values of 1.88 and 1.01, respectively, if 10 samples are used. $\sigma_{all}^2 = 0.3 \times$ FFP-RSD[14] (FFP-RSD=0.25 × the mean of the homogeneity test), and s_{an} is the estimate of the analytical standard deviation.

The results of all homogeneity tests are presented to the EUPT-SC. In special cases where the above homogeneity test criteria are not met, the EUPT-SC considering all relevant aspects (e.g. the homogeneity results of other pesticides spiked at the same time, the overall distribution the participants' results, the analytical difficulties faced during the test, knowledge of the analytical behaviour of the pesticide question) may decide to overrule the test. The reasons of this overruling have to be transparently explained in the Final EUPT-Report.

Stability of the analytes contained in the Test Item

The Test Items will also be tested for stability - according to ISO 13528, Annex B. The time delay between the first and the last stability test must exceed the period of the EUPT-exercise. Typically, the first analysis is carried out shortly before the shipment of the Test Items and the last one shortly after the deadline for submission of results. To better recognise trends and gain additional certainty one or more additional tests may be conducted by the Organisers. At least 6 sub-samples (analytical portions) should be analysed on each test day (e.g. 2 analytical portions withdrawn from three randomly chosen containers OR 6 portions withdrawn from a single container). In principle, all pesticides contained in the Test Item should be checked for stability. However, in individual cases, where sufficient knowledge exists that the stability of a certain analyte is very unlikely to be significantly affected during storage (e.g. based on experience from past stability tests or knowledge of its physicochemical properties), the Organisers, after consultation with the EUPT-QCG, may decide to omit a specific stability test. The EUPT-SC will finally decide whether analytes for which the stability test was not undertaken will be included in the final report, considering all relevant aspects such as the distribution of the participant's results (CV*).

A pesticide is considered to be adequately stable if $| y_i - y | \leq 0.3 \times \sigma_{pt}$, where y_i the mean value of the last period of the stability test, y is the mean value of the first period of the stability test and σ_{pt} the standard deviation used for proficiency assessment (typically 25 % of the assigned value).

[14] FFP-RSD = fit for purpose relative standard deviation, see also p. 11.

The results of all stability tests are presented to the EUPT-SC. In special cases where the above stability test criteria are not met, the EUPT-SC considering all relevant aspects (e.g. the past experience with the stability of the compound, the overall distribution the participants' results, the analytical difficulties faced during the test, knowledge about the analytical behaviour of the pesticide question) may decide to overrule the test. The reasons of this overruling will be transparently explained in the Final EUPT-Report.

The Organisers may also decide to conduct additional stability tests at different storage conditions than those recommended to the participants e.g. at ambient temperature.

Considering knowledge about the expected susceptibility of pesticides in the Test Item to possible losses, the Organisers will choose the shipment conditions to be such that pesticide losses are minimised (e.g. shipment of frozen samples, addition of dry ice). As shipment time can differ between labs/countries it is recommended that the Organisers conduct additional stability tests at conditions simulating shipment. Should critical losses be detected for certain pesticides the EUPT-SC will be informed (or the EUPT-QCG before or during the test). Case-by-case decisions may be taken considering all relevant aspects including the shipment time of the samples to each laboratory.

Methodologies to be used by the participants

Participating laboratories are instructed to use the analytical procedure(s) that they would routinely employ in official control activities (monitoring etc.). Where an analytical method has not yet been established routinely this should be stated.

General procedures for reporting results

Participating laboratories are responsible for reporting their own quantitative results to the Organiser within the stipulated deadline. Any pesticide that was targeted by a participating laboratory should be reported as "analysed". Each laboratory will be able to report only one result for each analyte detected in the Test Item. The concentrations of the pesticides detected should be expressed in 'mg/kg' unless indicated otherwise in the specific protocol.

The Test Item is intentionally treated with pesticides whereas the Blank Material is analysed to ensure that it does not contain any of the pesticides in the Target Pesticides List, at or above, the specified MRRLs. Both the Test Item and Blank Material have to be analysed by the participating laboratories and any pesticide detected in them must be reported.

Correction of results for recovery

According to the Method Validation and Quality Control Procedures for Pesticide Residues Analysis in Food and Feed[15], it is common practice that pesticide analysis results are not corrected for recovery, but may be corrected if the average recovery is significantly different from 100 % (typically if outside the 70 – 120 % range, but also exhibiting good precision). Other approaches for recovery correction explicitly allowed in the SANTE document are the use of stable isotope labelled analogues of the target analytes used as Internal Standards (ISTDs), the 'procedural calibration' approach as well as the approach of 'standard addition' with additions of analyte(s) being made to analytical portions. Where reported residue data have been automatically adjusted for recovery by the method, or have subsequently been adjusted using a recovery factor, this must be indicated on the specific field of the 'Result Submission Form'. Results may be corrected for recovery only in cases where this correction is applied in routine practice (including cases of MRL-violations). Laboratories are required to report whether their results were adjusted for recovery and, if a recovery factor was used, the recovery (in percentage) must also be reported. No recovery data are required where correction for recovery is automatic by using the 'standard addition approach, or isotopically-labelled internal standards (in both cases with spiking into the Test Item at the beginning of the extraction procedures). In these cases, the laboratories should report the actual approach that was followed.

Methodology information

All laboratories are requested to provide information on the analytical method(s) they have used. A compilation of the methodology information submitted by all participants is presented in an Annex of the final report or in a separate report. Where necessary the methods are evaluated and discussed, especially in those cases where the result distribution is not unimodal or very broad (e.g. CV* > 35 %). If no sufficient information on the methodology used is provided, the Organiser reserves the right not to accept the analytical results reported by the participants concerned.

[15] Document N° SANTE/11945/2015; Method Validation and Quality Control Procedures for Pesticide Residues Analysis in Food and Feed

Results evaluation

The procedures used for the treatment and assessment of results are described below.

- ***False Positives results***

These are results of pesticides from the Target Pesticides List, that are reported, at or above, their respective MRRL although they were: (i) not detected by the Organiser, even after repeated analyses, and/or (ii) not detected by the overwhelming majority (e.g. > 95 %) of the participating laboratories that had targeted the specific pesticides. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.
Any results reported lower than the MRRL will not be considered as false positives, even though these results should not have been reported.

- ***False Negative results***

These are results for pesticides reported by the laboratories as 'analysed' but without reporting numerical values although they were: a) used by the Organiser to treat the Test Item and b) detected by the Organiser as well as the majority of the participants that had targeted these specific pesticides at or above the respective MRRLs. Results reported as '< RL' (RL= Reporting Limit of the laboratory) will be considered as not detected and will be judged as false negatives. In certain instances, case-by-case decisions by the EUPT-Panel may be necessary.

In cases of the assigned value being less than a factor of 4 times the MRRL, false negatives will typically not be assigned. The EUPT-Panel may decide to take case-by-case decisions in this respect after considering all relevant factors such as the result distribution and the reporting limits of the affected labs.

- ***Estimation of the assigned value (x_{pt})***

In order to minimise the influence of out-lying results on the statistical evaluation, the assigned value x_{pt} (= consensus concentration) will typically be estimated using robust estimate of the participant's mean (x*) as described in ISO 13528:2015[16]. In special justifiable cases, the EUPT-Panel may decide to eliminate certain results traceably associated with gross errors (see "Omission or Exclusion of results" below) or to use only the results of a subgroup consisting of laboratories that have repeatedly demonstrated good performance for the specific compound in the past.

- ***Omission or Exclusion of results***

Before estimating the assigned value, results associated with obvious mistakes have to be examined to decide whether they should be removed from the population. Such gross errors may include incorrect recording (e.g. due to transcription errors by the participant, decimal point faults or transposed digits, incorrect unit), calculation errors (e.g. missing factors), analysis of a wrong sample/extract (e.g. a spiked blank), use of wrong concentrations of standard solutions, incorrect data processing (e.g. integration of wrong peak), major deviations from the analytical procedure, inappropriate storage or transport conditions (in case of susceptible compounds), and the use of inappropriate procedures that demonstrably lead to significantly biased results (e.g. due to degradation or incomplete extraction). Where the Organisers (e.g. after the publication of the preliminary report) receive information of such gross errors, having a significant impact on a generated result, the affected results will be examined on a case-by-case basis to decide whether, or not, they should be excluded from the population used for robust statistics. Results may also be omitted e.g. if an inappropriate method has been used even if they are not outliers. All decisions to omit/exclude results will be discussed with the EUPT-SC and the reasoning for the omission of each result clearly stated in the final EUPT-Report. However, z scores will be calculated for all results irrespective of the fact that they were omitted from the calculation of the assigned value.

Omitted results might be interesting as they might give indications about possible source(s) of errors. The Organisers will thus ask the relevant lab(s) to provide feedback on possible sources of errors (see also "follow-up activities").

Uncertainty of the assigned value

The uncertainty of the assigned values $u(x_{pt})$ is calculated according to ISO 13528:2015 as:

$$u(x_{pt}) = 1.25\frac{s^*}{\sqrt{p}}$$

where s^* is the robust standard deviation and p is the number of results.

[16] DIN ISO 13528:2015, Statistical methods for use in proficiency testing by interlaboratory comparisons, International Organization for Standardization. Therein a specific robust method for determination of the consensus mean and standard deviation without the need for removal of deviating results is described (Algorithm A in Annex C).

In certain cases and considering all relevant factors (e.g. the result distribution, multimodality), the number of submitted results, information regarding analyte homogeneity/stability, information regarding the use of methodologies that might produce a bias that were used by the participants), the EUPT-Panel may consider the assigned value of a specific analyte to be too uncertain and decide that the results should not be evaluated, or only evaluated for informative purposes. The provisions of ISO 13528:2015 concerning the uncertainty of the assigned value will be taken into account.

– ***Standard deviation of the assigned value (target standard deviation)***

The target standard deviation of the assigned value (FFP-σ_{pt}) will be calculated using a Fit-For-Purpose approach with a fixed Relative Standard Deviation (FFP-RSD) of 25 % as follows:

$$\text{FFP-}\sigma_{pt} = 0.25 \times x_{pt}$$

The percentage FFP-RSD is set at 25 % based on experience from results of previous EUPTs[17]. The EUPT-Panel reserves the right to also employ other approaches on a case-by-case basis considering analytical difficulties and experience gained from previous proficiency tests.

For informative purposes the robust relative standard deviation (CV*) is calculated according to ISO 13528:2015; Chapter 7.7 (Consensus value from participant results) following Algorithm A in Annex C.

– ***z scores***

This parameter is calculated using the following formula:

where x_i is the value reported by the laboratory, x_{pt} is the assigned value, and FFP-σ_{pt} is the standard deviation using FFP approach. Z scores will be rounded to one decimal place. For the calculation of combined z scores (see below) the original z scores will be used and rounded to one decimal place after calculation.

Any z scores > 5 will be typically reported as '> 5' and a value of '5' will be used to calculate combined z scores (see below).

Z scores will be interpreted in the following way, as is set in the ISO 17043:2010[18]:

$\lvert z \rvert \leq 2.0$	Acceptable
$2.0 < \lvert z \rvert < 3.0$	Questionable
$\lvert z \rvert \geq 3.0$	Unacceptable

For results considered as false negatives, z scores will be calculated using the MRRL or RL (the laboratory's Reporting Limit) if the RL < MRRL. The EUPT-Panel will decide whether, or not, these values should appear in the z score histograms.

– ***Category A and B classification***

The EUPT-Panel will decide if and how to classify the laboratories into two categories - A or B. Currently, laboratories that are able to analyse at least 90 % of the compulsory pesticides in the target pesticides list, have correctly detected and quantified a sufficiently high percentage of the pesticides present in the Test Item (at least 90 %) and reported no false positives will have demonstrated 'sufficient scope' and can therefore be classified into Category A. For the 90 % criterion the number of pesticides needed to be correctly analysed to have sufficient scope will be calculated by multiplying the number of compulsory pesticides from the Target Pesticides List by 0.9 and rounding to the nearest full number with 0.5 decimals being rounded downwards (see some examples in Table 1).

TABLE 1. NO. OF PESTICIDES FROM THE TARGET PESTICIDES LIST NEEDED TO BE TARGETED OR PESTICIDES PRESENT IN THE TEST ITEM THAT NEED TO BE CORRECTLY DETECTED AND QUANTIFIED TO HAVE SUFFICIENT SCOPE.

No. of compulsory pesticides present in the Test Item / Target Pesticides List (N)	90 %	No. of pesticides needed to be correctly detected and quantified / targeted to have sufficient scope (n)	n
3	2.7	3	N
4	3.6	4	
5	4.5	4	N - 1
6	5.4	5	
7	6.3	6	
8	7.2	7	
9	8.1	8	
10	9.0	9	

$$z_i = \frac{(x_i - x_{pt})}{FFP\text{-}\sigma_{pt}}$$

[17] Comparative Study of the Main Top-down Approaches for the Estimation of Measurement Uncertainty in Multiresidue Analysis of Pesticides in Fruits and Vegetables. J. Agric. Food Chem., 2011, 59(14), 7609-7619.
[18] ISO/IEC 17043:2010. Conformity assessment – General requirements for proficiency testing

ANNEX 1. Protocols and Target list of pesticides to be sought.

No. of compulsory pesticides present in the Test Item / Target Pesticides List (N)	90 %	No. of pesticides needed to be correctly detected and quantified / targeted to have sufficient scope (n)	n
11	9.9	10	
12	10.8	11	
13	11.7	12	
14	12.6	13	
15	13.5	13	
16	14.4	14	
17	15.3	15	
18	16.2	16	
19	17.1	17	
20	18	18	N - 2
21	18.9	19	
22	19.8	20	
23	20.7	21	
24	21.6	22	
25	22.5	22	N - 3
26	23.4	23	

- ***Overall performance of laboratories - combined z scores***

For evaluation of the overall performance of laboratories within Category A, the Average of the Squared z Score (AZ^2)[19,20] (see below) will be used. The AZ^2 is calculated as follows:

$$AZ^2 = \frac{\sum_{i=1}^{n} z_i^2}{n}$$

Where n is the number of z scores to be considered in the calculation. In the calculation of the AZ^2, z scores higher than 5 will be classified as 5. Based on the AZ^2 achieved, the laboratories are classified as follows:

$AZ^2 \leq 2.0$	Good
$2.0 < AZ^2 < 3.0$	Satisfactory
$AZ^2 \geq 3.0$	Unsatisfactory

Combined z scores are considered to be of lesser importance than the individual z scores. The EUPT-Panel retains the right not to calculate AZ^2 if it is considered as not being useful or if the number of results reported by any participant is considered to be too low.

In the case of EUPT-SRMs, where only a few results per lab may be available, the Average of the Absolute z scores (AAZ) may be calculated for informative purposes, but only for labs that have reported enough results to obtain 5 or more z scores. For the calculation of the AAZ, z scores higher than 5 will also be classified as 5.

Laboratories within Category B will be ranked according to the total number of pesticides that they correctly reported to be present in the Test Item. The number of acceptable z scores achieved will be presented, too. The EURL-Panel retains the right to calculate combined z scores (see above) also for labs within Category B, e.g. for informative purposes, provided that a minimum number of results (z scores) have been reported.

Publication of results

The EURLs will publish a preliminary report, containing tentative assigned values and z score values for all pesticides present in the Test Item, within 2 months of the deadline for result submission.
The Final EUPT Report will be published after the EUPT-Panel has discussed the results. Taking into account that the EUPT-Panel meets normally only once a year (typically in late summer or autumn) to discuss the results of all EUPTs organised by the EURLs earlier in the year, the final report may be published up to 10 months after the deadline for results submission.

[19] Formerly named "Sum of squared z scores (SZ^2)"

[20] Laboratory assessment by combined z score values in proficiency tests: experience gained through the EUPT for pesticide residues in fruits and vegetables. Anal. Bioanal. Chem., 2010, 397, 3061–3070.

Certificates of participation

Together with the Final EUPT-Report, the EURL Organiser will deliver a Certificate of Participation to each participating laboratory showing the z scores achieved for each individual pesticide, the combined z scores calculated (if any), and the classification into Category A or B.

Feedback

At any time before, during or after the PT participants have the possibility to contact the Organisers and make suggestions or indicate errors. After the distribution of the Final EUPT-Report, participating laboratories will be given the opportunity to give their feedback to the Organisers and make suggestions for future improvements.

Correction of errors

Should errors be discovered in any of the documents issued prior to the EUPT (Calendar, Target Pesticides List, Specific Protocol, General Protocol) the corrected documents will be uploaded onto the website and in the case of substantial errors the participants will be informed. **Before starting the exercise participants should make sure to download the latest version of these documents.**

If substantial errors are discovered in the Preliminary EUPT-Report the Organisers will distribute a new corrected version, where it will be stated that the previous version is no longer valid.

Where substantial errors are discovered in the Final EUPT-Report the EUPT-Panel will decide whether a corrigendum will be issued and how this should look. The online version of the final report will be replaced by the new one and all affected labs will be contacted.

Where errors are discovered in EUPT-Certificates the relevant laboratories will be sent new corrected ones. Where necessary the laboratories will be asked to return the old ones.

Follow-up activities

Laboratories are expected to undertake follow-up activities to trace back the sources of erroneous or strongly deviating results (typically those with $|z| > 2.0$) - including all false positives. Even results within $|z| \leq 2.0$ may have to be checked if there are indications of a significant positive or negative bias.

Upon request, the laboratory's corresponding NRL and EURL are to be informed of the outcome of any investigative activities for false positives, false negatives and for results with $|z| \geq 3.0$. Concerning z scores between 2.0 and 3.0 the communication of the outcome of traceability activities is optional but highly encouraged where the source of deviation could be identified and could be of interest to other labs.

According to instructions from DG-SANTE, the "Protocol for management of underperformance in comparative testing and/or lack of collaboration of National Reference Laboratories (NRLs) with EU Reference Laboratories (EURLs) activities" is to be followed.

NRLs will be considered as **underperforming in relation to scope** if in two EUPTs of the last four EUPTs falling within their responsibility area if they: a) haven't participated, or b) targeted less than 90 % of the compulsory pesticides in the target lists (80 % for SRM-compounds), or c) detected less than 90 % of the compulsory compounds present in the test items (80 % for SRM-compounds). Additionally, NRLs that obtained AZ^2 higher than 3 in two consecutive EUPTs of the last four EUPTs, will be considered as **underperforming in accuracy**. A two-step protocol established by DG-SANTE will be applied as soon as underperformance of an NRL is detected[21]:

Phase 1:

- Identifying the origin of the bad results (failure in EUPTs).
- Actions: On the spot visits and training if necessary and repetition of the comparative test if feasible and close the assessment of results by the EURL.

Phase 2:

- If the results still reveal underperformance the Commission shall be informed officially by the EURL including a report of the main findings and corrective actions.
- The Commission shall inform the Competent Authority and require that appropriate actions are taken.

Underperformance rules for the OfLs will be established at a later stage.

[21] Article 32 of the Regulation 882/2004

ANNEX 1. Protocols and Target list of pesticides to be sought.

Disclaimer

The EUPT-Panel retains the right to change any parts of this EUPT – General Protocol based on new scientific or technical information. Any changes will be communicated in due course.

EUPT-FV-18 SPECIFIC PROTOCOL

European Union Proficiency Test for Pesticide Residues in Fruits and Vegetables (2016)

Introduction
This protocol is complementary to the General Protocol of EU Proficiency Tests (EUPT) for Pesticide Residues in Food and Feed (6th Edition). This Proficiency Test is organised by the EURL for Pesticide Residues in Fruits and Vegetables covering Multiresidue Methods (MRM) of analysis.

According to Article 28 of Regulation 396/2005/EC (23rd February, 2005) of the European Parliament and of the Council, all laboratories analysing samples for the official control of pesticide residues shall participate in the European Union Proficiency Tests (EUPTs) for pesticide residues organised by the European Union.

These proficiency tests are carried out in order to improve the quality, accuracy and comparability of the residue data and to evaluate the laboratory capacity to report results that covers the entire range of maximum residue limits (0.005 - 15 mg/kg) in all groups of fruit and vegetable matrices (high water, acid and fat content). Bearing that, a wide concentration range should be covered with the different analytes present in the test item.

Test Item
This proficiency test is based on the analysis of incurred pesticide residues in **spinach**. The spinaches were grown in a greenhouse. The pesticide treatments carried out were pre-harvest using commercial formulations. The test item was frozen (using liquid nitrogen), chopped, homogenised and sub-sampled into polyethylene bottles that had previously been coded.

Ten of these bottles containing the test item were chosen randomly, and analysed to check for homogeneity.

The test item was stored frozen (–20ºC) prior to shipment to participants.

Six bottles, again chosen randomly, will be analysed over a period of time to confirm the stability of the pesticides in the test item (three when the test items are shipped, then other three bottles a few days after the deadline for submitting results). There will be one further analysis during this period reproducing the sample shipment to see if there is any degradation of any of the pesticides present in the test item.

Subcontracting
All analytical determinations concerning the test item treatment analysis will be performed in a laboratory which is ISO 17025 accredited.

Target List
In addition to the pesticide target list of mandatory compounds, a "voluntary target list" containing pesticides which might be present in the test item will be published. Those voluntary pesticides will not be used for the evaluation of the laboratories into Category A or B, and a separate statistical evaluation will be made for them.

Assigned value and robust relative standard deviation
In order to minimise the influence of out-lying results on the statistical evaluation, the assigned value will be estimated using the robust statistics as described In ANNEX C of ISO 13258:2015, where the robust average (x*) according algorithm A is defined.

Also, the robust relative standard deviation (CVs*) will be calculated for each analyte.

Laboratory assessment
For the assessment of the overall laboratory performance, the Average of the Squared z-Score (AZ^2) will be used as in the last Proficiency Test, but only for those laboratories in Category A, which will be those laboratories that are able to analyse at least 90 % of the pesticides in the target list, that are able to detect at least 90 % of the pesticides present in the test material and that report no false negatives neither false positives. Within Category A, the laboratories will be sub-classified as "good", "satisfactory" or "unsatisfactory". All the other laboratories will be classified in Category B. This information will be available in the General Protocol.

ANNEX 1. Protocols and Target list of pesticides to be sought.

Steps to follow
This Proficiency Test will be made up of the following 9 essential steps:

1. To participate, each laboratory must complete the Application Form on-line, available on the EURL-FV Web page, before the deadline stipulated on the Calendar. It is recommended that laboratories download the Target Pesticide List from this web site. Laboratories should carefully read the Target Pesticide List, where important information about the reporting of the results, as well as the Minimum Required Reporting Limits (MRRLs), is given. The MRRLs do not always correspond with the EU MRLs set for spinach.

2. When the registration period is closed, laboratories will receive an e-mail confirming their participation in this exercise, and assigning them each a Laboratory Code. Laboratories with this code will be able to access the restricted area containing the forms using their login information - consisting of their **USER NAME,** which is the Laboratory Code expressed as **LabXXX** (three digits with no spaces between them) and their **PASSWORD**, as chosen on the application form.

3. The sample delivery will be **200 euros** for EU-NRLs, **230 euros** for EU/EFTA official laboratories and **250 euros** for official laboratories from other countries. The laboratories will receive an invoice and after that they can start the payment procedure. An e-mail showing the bank transfer confirmation, or similar, may be requested at any time by the Organiser. **Payments without a Laboratory Code identifying them will not be considered as paid.**

4. Any communication with the Organisation should be made using a **Contact Form** placed in the restricted area.

5. **Form 0 - Laboratory Scope** will be placed in the restricted area and will be open to participants from the 25th January - 5th February 2016, prior to test item shipment. The aim is that laboratories provide information regarding their scope of analysis before receipt of the test item and detailed information regarding which pesticide is within the accredited scope of the lab and which is not. After the deadline it will not be possible to change the scope.

6. When the participant laboratories receive the test item (and not before), they must enter the restricted area again and submit **Form 1 - Test Item Receipt** to inform the Organiser that they have accepted the test item. This Form has a deadline: 12th February 2016, which must be met. If no test item has been received by this deadline, the laboratories should contact the Organiser using the Contact Form of the restricted area. If form 1 is not filled in, the Organiser will consider that the participant has accepted the test item.

7. The participant laboratories must respect the deadline for submitting their results – 1st March 2016- using **Form 2** – **Identified pesticides**; **Form 3** - **Results** and **Form 4** - **Methods** on-line.

8. One final form, **Form 5 - Additional Information Requested** can be filled in after the deadline has passed. This Form will be available from 7th-11th March 2016. Not all laboratories may need to fill this in. It will depend upon information reported on previous Forms.

9. The Organiser will evaluate the results at the end of the proficiency test, once the deadline for receipt of results has passed. The Organiser will upload an electronic version on the EURL-FV web site and afterwards send a hard copy of the Final Report to each participant laboratory. This report will include information regarding the design of the test, the homogeneity and stability results, a statistical evaluation of the participant's results as well as graphical displays of the results and any conclusions. Further relevant information considered to be of value may also be included.

Form 0 - Laboratory Scope
Before the participant laboratories receive the sample, the restricted area will be open so that their laboratory scopes can be recorded. Form 0 will need to be filled in to ascertain which of the pesticides in the Target Pesticide List were actually sought. After the deadline it will not be possible to change the scope.
This form will also request information on which of the pesticides sought by the laboratory is within the laboratory's accredited scope.

Amount of Test Item
Participants will receive:
- Approximately 200 g of spinach test item treated with pesticides.
- Approximately 200 g of 'blank' spinach test item.

Shipment of Test Item
All Test Items will be frozen and packed in polystyrene boxes surrounded in dry ice and packed into cardboard boxes.

The shipment of the test items will be carried out over a one-week period from the 8th February 2016. The Organiser will try to ensure that all the packages arrive on the same day to each laboratory. An information message will be sent out by e-mail before shipment. Laboratories must make their own arrangements for the receipt of the package. They must inform the Organiser of any public holidays in their country/city during the

delivery period given in the calendar, as well as making the necessary arrangements for receiving the shipment, even if the laboratory is closed.

Advice on Test Item Handling
Once received, the test item should be stored deeply frozen (-18°C or less) prior to analysis thus avoiding any possible deterioration/spoilage. The test item should be mixed thoroughly before taking the analytical portion(s).

All participants should use their own routine standard operating procedures for extraction, clean-up and analytical measurement and their own reference standards for identification and quantification.

Form 1 - Test Item Receipt
Once the laboratory has received the test item, its arrival must be reported to the Organiser using Form 1 in the restricted area; filling in the date of receipt, the condition of the test item, and its acceptance. The deadline for acceptance (or non-acceptance) is 12th February 2016. If the laboratory does not respond by this date, the Organiser will assume that the test item has been received and accepted.

If any laboratory has not received the test item by 12th February, they must inform the Organiser **immediately** using the Contact Form of the restricted area.

Submission of results:
Once the laboratory has analysed the test item and is ready to submit their data, they must enter their results at various steps on 3 forms by accessing the restricted area in the EURL –FV web site: http://www.eurl-pesticides.eu

Identified Pesticides – Form 2
In Form 2, the information entered in Form 0 – Laboratory Scope, will be made available again.

For each pesticide included in the laboratory scope, the Limit of Quantification (LOQ) will be requested. The MRRL and the participant's own LOQ will be used to help identify false negative results.

Before this, a question will be requested as to which approach was used for the relative expanded uncertainty estimation in multiresidue methods for fruits and vegetables.

The laboratories will be also asked to report any pesticide that may have been detected in the blank test item
This form can be filled in at various stages - so once entered, the data will be saved, and the laboratories can add further data at a later date.

Results – Form 3
In this step, the laboratory should report the measured concentrations for each determination. All concentrations must be expressed in mg/kg together with the recovery as a percentage.

The number of significant figures should be based on the procedures provided in SANTE/11945/2015. Additional significant figures may be recorded for the purpose of statistical analysis.

Results should not be reported where a pesticide was not detected or was detected below the laboratory LOQ. In both cases, this should be recorded as 'ND'. If a pesticide was not sought, it should be recorded as 'NA' (Not Analysed). The actual results/residue levels measured must be reported as numbers. Symbols (>, <, ±, ≥, ≤, …) will not be accepted. IMPORTANT: If your result is not correctly expressed it will be considered as 'NA' (Not Analysed).

Methods – Form 4
In this step, the laboratory must report the details of the analytical methods they used. A list including all the pesticides detected in the sample will be shown along with a pesticide reference number. Laboratories may describe a method for the first pesticide and use this pesticide reference number to refer to other pesticides determined using the same method.

Again in this form, information must always be saved so that laboratories can go back to it and continue at any time before the final reporting deadline - which for all forms is 1st March 2016. Any results reported after this deadline will not be included in the statistical treatment, nor in the final report.

It should **not** be assumed that only pesticides registered for use on spinach are present in the test item.

False Negatives or Additional Information – Form 5
This Form will be available only for those laboratories reporting that they sought a pesticide present in the test item but for which no method was reported in Form 4. If a laboratory accesses this Form and it is empty, this will mean that there is no need to enter further information. This Form will be available after the deadline is over - from 7th-11th March 2016.

ANNEX 1. Protocols and Target list of pesticides to be sought.

Calendar

ACTIVITY	DATE
Publishing the Calendar and Matrix on the Web page.	9th November 2015
Receiving Application Form from invited laboratories.	1st December-11th January 2016
Specific Protocol published on the Web site.	25th January 2016 at the latest
Deadline for receiving Laboratory scope: Form 0	25th January - 5th February 2016
Sample distribution.	8th February 2016
Deadline for receiving sample acceptance: Form 1	12th February 2016
Deadline for receiving results: Forms 2, 3 and 4	1st March 2016
Filling in Form 5	7th-11th March 2016
Preliminary Report: only results, no statistical treatment.	Last week of March 2016
Final Report distributed to the Laboratories.	December 2016

Cost of test item shipment.
EU-NRLs laboratories will be charged **200 €** for the shipment cost, for **EU/EFTA official laboratories** the amount will be **230 €**, and **250 €** for official laboratories from other countries. Regarding payment procedures - each laboratory can specify their details and invoice requests when applying for the test.

Please, do not pay for this EUPT until we send you the invoice.
Remember to include your Laboratory Code in the subject of the bank transfer.

Payment details are as follows:

BANK NAME: CAJAMAR - Caja Rural Sociedad Corporativa de Crédito
BANK ACCOUNT HOLDER: Universidad de Almeria
BANK ADDRESS: Office Number 990. Universidad de Almeria. Spain
ACCOUNT NUMBER: ES0730580130172731005000
SWIFT: CCRIES2A
REFERENCE GIVEN: Lab Code

Contact information
The official organising group details are as follows:

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Mr. Ralf Lippold, Senior Chemist, CVUA, Freiburg, Germany.

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TARGET PESTICIDE LIST FOR THE EUPT-FV-18

Pesticide	MRRL (mg/Kg)
Acephate	0.01
Acetamiprid	0.01
Acrinathrin	0.01
Aldicarb	0.01
Aldicarb Sulfone	0.01
Aldicarb Sulfoxide	0.01
Aldrin	**0.01**
Azinphos-methyl	0.01
Azoxystrobin	0.01
Benfuracarb	0.01
Bifenthrin	0.01
Biphenyl	**0.01**
Bitertanol	0.01
Boscalid	0.01
Bromopropylate	0.01
Bromuconazole	0.01
Bupirimate	0.01
Buprofezin	0.01
Cadusafos	0.006
Carbaryl	0.01
Carbendazim and benomyl (sum of benomyl and carbendazim expressed as carbendazim)	0.01
Carbofuran	0.01
Carbofuran-3-hydroxy	0.01
Carbosulfan	0.01
Chlorantraniliprole	**0.01**
Chlorfenapyr	0.01
Chlorfenvinphos	0.01
Chlorobenzilate	0.01
Chlorothalonil	0.01
Chlorpropham	0.01
Chlorpyrifos	0.01
Chlorpyrifos-methyl	0.01
Clofentezine	0.01
Clothianidin	0.01
Cyfluthrin (cyfluthrin incl. other mixtures of constituent isomers (sum of isomers))	0.01
Cymoxanil	**0.01**
Cypermethrin (cypermethrin incl. other mixtures of constituent isomers (sum of isomers))	0.01
Cyproconazole	0.01
Cyprodinil	0.01
Deltamethrin (cis-deltamethrin)	0.01
Demeton-S-methylsulfone	0.006
Diazinon	0.01
Dichlofluanid	0.01
Dichlorvos	0.01
Dicloran	0.01
Dicofol (sum of p, p´ and o,p´ isomers)	0.01
Dieldrin	**0.01**
Diethofencarb	0.01
Difenoconazole	0.01
Diflubenzuron	0.01
Dimethoate	0.003
Dimethomorph	0.01
Dimethylaminosulfotoluidide (DMST)	0.01
Diniconazole	0.01
Diphenylamine	0.01
Endosulfan alpha	0.01
Endosulfan beta	0.01

ANNEX 1. Protocols and Target list of pesticides to be sought.

Pesticide	MRRL (mg/Kg)
Endosulfan sulfate	0.01
EPN	0.01
Epoxiconazole	0.01
Ethion	0.01
Ethirimol	0.01
Ethoprophos	0.008
Etofenprox	0.01
Famoxadone	**0.01**
Fenamidone	0.01
Fenamiphos	0.01
Fenamiphos sulfone	0.01
Fenamiphos sulfoxide	0.01
Fenarimol	0.01
Fenazaquin	0.01
Fenbuconazole	0.01
Fenhexamid	0.01
Fenitrothion	0.01
Fenoxycarb	0.01
Fenpropathrin	0.01
Fenpropidin	**0.01**
Fenpropimorph	0.01
Fenpyroximate	0.01
Fenthion	0.01
Fenthion oxon	0.01
Fenthion oxon sulfone	0.01
Fenthion oxon sulfoxide	0.01
Fenthion sulfone	0.01
Fenthion sulfoxide	0.01
Fenvalerate (any ratio of constituent isomers (RR, SS, RS & SR) including esfenvalerate)	0.01
Fipronil (only parent compound)	0.004
Fludioxonil	0.01
Flufenoxuron	0.01
Fluopicolide	0.01
Fluopyram	0.01
Fluquinconazole	0.01
Flusilazole	0.01
Flutolanil	0.01
Flutriafol	0.01
Fosthiazate	0.01
Hexaconazole	0.01
Hexythiazox	0.01
Imazalil	0.01
Imidacloprid	0.01
Indoxacarb (sum of indoxacarb and its R enantiomer)	0.01
Iprodione	0.01
Iprovalicarb	0.01
Isocarbophos	0.01
Isofenphos-methyl	0.01
Isoprothiolane	0.01
Kresoxim-methyl	0.01
Lambda-Cyhalothrin	0.01
Linuron	0.01
Lufenuron	0.01
Malaoxon	0.01
Malathion	0.01
Mandipropamid	0.01
Mepanipyrim	0.01
Metaflumizone (sum of E- and Z- isomers)	0.01
Metalaxyl and metalaxyl-M	0.01
Metconazole (sum of isomers)	0.01
Methamidophos	0.01
Methidathion	0.01
Methiocarb	0.01
Methiocarb sulfone	0.01
Methiocarb sulfoxide	0.01

Pesticide	MRRL (mg/Kg)
Methomyl	0.01
Methoxyfenozide	0.01
Monocrotophos	0.01
Myclobutanyl	0.01
Omethoate	0.003
Orthophenylphenol	0.01
Oxadixyl	0.01
Oxamyl	0.01
Oxydemeton-methyl	0.006
Paclobutrazole	0.01
Paraoxon-methyl	0.01
Parathion-ethyl	0.01
Parathion-methyl	0.01
Penconazole	0.01
Pencycuron	0.01
Pendimethalin	0.01
Permethrin (sum of isomers)	0.01
Phenthoate	0.01
Phosalone	0.01
Phosmet	0.01
Phosmet oxon	0.01
Phoxim	0.01
Pirimicarb	0.01
Pirimicarb-desmethyl	0.01
Pirimiphos-methyl	0.01
Prochloraz (only parent compound)	0.01
Procymidone	0.01
Profenofos	0.01
Propamocarb	**0.01**
Propargite	0.01
Propiconazole	0.01
Propyzamide	0.01
Prothioconazole (Prothioconazole-desthio)	0.01
Prothiofos	0.01
Pyraclostrobin	0.01
Pyridaben	0.01
Pyrimethanil	0.01
Pyriproxyfen	0.01
Quinoxyfen	0.01
Spinosad (sum of spinosyn A and spinosyn D, expr. as spinosad)	0.01
Spirodiclofen	0.01
Spiroxamine	0.01
Tau-Fluvalinate	0.01
Tebuconazole	0.01
Tebufenozide	0.01
Tebufenpyrad	0.01
Teflubenzuron	0.01
Tefluthrin	0.01
Terbuthylazine	0.01
Tetraconazole	0.01
Tetradifon	0.01
Thiabendazole	0.01
Thiacloprid	0.01
Thiamethoxam	0.01
Thiodicarb	0.01
Thiophanate-methyl	0.01
Tolclofos-methyl	0.01
Tolylfluanid	0.01
Triadimefon	0.01
Triadimenol	0.01
Triazophos	0.01
Trichlorfon	0.01
Trifloxystrobin	0.01
Triflumuron	0.01
Trifluralin	0.01

ANNEX 1. Protocols and Target list of pesticides to be sought.

Pesticide	MRRL (mg/Kg)
Triticonazole	0.01
Vinclozolin (only parent compound)	0.01
Zoxamide	0.01

In bold: new pesticides this year

This list is based on Commission implementing Regulation (EU) 2015/595 of 15 April 2015
The MRRLs are based on Regulation (EC) No. 396/2005 and Commission Directive 2006/125/EC.

VOLUNTARY PESTICIDE LIST FOR THE EUPT-FV-18

Pesticide	MRRL (mg/Kg)
Ametoctradin	0.01
Benalaxyl including other mixtures of constituent isomers including benalaxyl-M (sum of isomers)	0.01
Benzovindiflupyr	0.01
Clomazone	0.01
Cyazofamid	0.01
Emamectin benzoate B1a, expressed as emamectin	0.01
Etoxazole	0.01
Fenpyrazamine	0.01
Fluxapyroxad	0.01
Heptachlor	0.01
Heptachlor epoxide	0.01
Isopyrazam	0.01
Penflufen	0.01
Penthiopyrad	0.01
Prosulfocarb	0.01
Pyrethrins	0.01
Quintozene	0.01
Pentachloro-aniline	0.01
Rotenone	0.01
Spirotetramat	0.01
Spirotetramat metabolite BYI08330-enol	0.01
Spirotetramat metabolite BYI08330-ketohydroxy	0.01
Spirotetramat metabolite BYI08330-monohydroxy	0.01
Spirotetramat metabolite BYI08330 enol-glucoside	0.01
Tetramethrin	0.01

This list is based on the working document SANCO/12745/2013

ANNEX 2. List of laboratories that agreed to participate in EUPT-FV-18.

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Austria	Austrian Agency For Health And Food Safety, Institute for Food Safety, Department for Pesticide and Food Analysis (PLMA)	Innsbruck	Yes
Austria	MA 38 - Lebensmitteluntersuchung Wien	Wien	Yes
Belgium	Primoris Belgium	Zwijnaarde	Yes
Belgium	Eurofins Lab Zeeuws-Vlaanderen B.V.	Graauw	Yes
Belgium	Scientific Institute of Public Health	Brussels	Yes
Belgium	LOVAP NV	Geel	Yes
Belgium	Groen Agro Control	Delfgauw	Yes
Belgium	Dr. A. Verwey B.V. member of the Agrolab group	Rotterdam	Yes
Belgium	Laboratory Phytocontrol	Nimes	Yes
Bulgaria	Fytolab Bulgaria Ltd.	Plovdiv	Yes
Bulgaria	Euro Lab	Svilengrad	Yes
Bulgaria	Central laboratory for chemical testing and control	Sofia	Yes
China	Inspection and Quarantine Technique Center of Qinhuangdao Entry-Exit Inspection and Quarantine Bureau of P. R. China	Qinhuangdao	Yes
China	Agro-product Safety Research Center, Chinese Academy of Inspection and Quarantine	Beijing	Yes
China	Shanghai Municipal Center for Disease Control and Prevention	Shanghai	Yes
Colombia	Laboratorio de Analisis de Residuos de Plaguicidas	Bogota D.C.	Yes
Costa Rica	Laboratorio de Análisis de Residuos	San José	Yes
Costa Rica	Centro de Investigación en Contaminación Ambiental (CICA), Universidad de Costa Rica	San José	Yes
Croatia	Teaching institute of public health dr Andrija Štampar	Zagreb	Yes
Croatia	Croatian National Institute of Public Health	Zagreb	Yes
Croatia	Faculty of food technology and biotechnology, Food control center	Zagreb	Yes
Croatia	Teaching Institute of Public Health of Primorsko-goranska County	Rijeka	Yes
Croatia	Institute Of Public Health Split	Split	Yes
Croatia	Euroinspekt-Croatiakontrola	Zagreb	Yes
Croatia	EC Inspekt d.o.o.	Zagreb	Yes
Cyprus	Pesticide Residues Laboratory of the State General Laboratory	Nicosia	Yes
Czech Republic	Department of Food Analysis and Nutrition, University of Chemistry and Technology	Prague	Yes
Czech Republic	Czech Agriculture and Food Inspection Authority	Prague	Yes

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Czech Republic	Central Institute for Supervising and Testing in Agriculture (UKZUZ)	Brno	Yes
Denmark	Danish Veterinary and Food Administration	Ringsted	Yes
Denmark	National Food Institute, Technical University of Denmark	Soeborg	Yes
Egypt	Central Lab of Residue Analysis of Pesticides and Heavy Metals in Foods	Giza	Yes
Estonia	Laboratory for Residues and Contaminants, Agricultural Research Centre	Saku	Yes
Estonia	Tartu Laboratory of Health Board	Tartu	Yes
Finland	MetropoliLab Ltd	Helsinki	Yes
Finland	Finnish Customs Laboratory	Espoo	Yes
France	Laboratoire du SCL-IDF Massy	Massy Cedex	Yes
France	Inovalys Le Mans	Le Mans	Yes
France	Capinov	Landerneau Cedex	Yes
France	Cereco Sud	Garons	Yes
France	Laboratoire du SCL de Montpellier	Montpellier	Yes
France	Centre d'Analyses Méditerranée Pyrénées	Perpignan	Yes
France	Fredon Pays De La Loire / Girpa	Beaucouze	Yes
Germany	Landesuntersuchungsamt für Chemie, Hygiene und Veterinärmedizin	Bremen	Yes
Germany	Chemical and Veterinary Analytical Institut Rhine-Ruhr-Wupper	Krefeld	Yes
Germany	Thueringer Landesamt fuer Verbraucherschutz	Bad Langensalza	Yes
Germany	Landeslabor Berlin-Brandenburg	Frankfurt (Oder)	Yes
Germany	BVL-NRL for Pesticides	Berlin	Yes
Germany	CVUA-Westfalen	Bochum	Yes
Germany	Landesamt für Landwirtschaft, Lebensmittelsicherheit und Fischerei	Rostock	Yes
Germany	Nds. Landesamt fuer Verbraucherschutz und Lebensmittelsicherheit	Oldenburg	Yes
Germany	GALAB Laboratories GmbH	Hamburg	Yes
Germany	LUA Sachsen	Dresden	Yes
Germany	Landesamt für Verbraucherschutz Sachsen-Anhalt	Halle/Saale	Yes
Germany	Landesuntersuchungsamt Institut für Lebensmittelchemie Speyer	Speyer	Yes
Germany	LUFA-ITL GmbH	Kiel	Yes
Germany	LTZ Augustenberg	Karlsruhe	Yes
Germany	Chemisches und Veterinäruntersuchungsamt Stuttgart	Fellbach	Yes

ANNEX 2. List of laboratories that agreed to participate in EUPT-FV-18.

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Germany	Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit (LGL)	Erlangen	Yes
Germany	State Laboratory Schleswig-Holstein	Neumünster	Yes
Germany	CVUA-OWL	Detmold	Yes
Germany	Institut für Hygiene und Umwelt	Hamburg	Yes
Germany	Landesamt für Umwelt und Arbeitsschutz	Saarbrücken	No
Germany	Eurofins SOFIA GmbH	Berlin	Yes
Germany	CVUA-MEL	Muenster	Yes
Germany	Zentrales Institut des Sanitätsdienstes der Bundeswehr KIEL	Kronshagen	Yes
Germany	Landesbetrieb Hessisches Landeslabor	Kassel	Yes
Germany	ILAU GmbH	Anzing	Yes
Germany	Amt fuer Verbraucherschutz Duesseldorf - Chemische und Lebensmitteluntersuchung	Duesseldorf	Yes
Germany	Central Institute of the Bundeswehr Medical Service Munich	Garching-Hochbrück	Yes
Germany	Chemisches Labor Dr. Mang	Frankfurt am Main	Yes
Germany	Labor Friedle GmbH	Tegernheim	Yes
Greece	Benaki Phytopathological Institute, Pesticide Residue Lab	Kifissia	Yes
Greece	Periferal Center Of Plant Protection And Quality Control Of Kavala	Kavala	Yes
Greece	Regional Center of Plant Protection and Quality Control of Achaia	Patra	Yes
Greece	Regional Center Of Plant Protection & Quality Control Of Magnesia, Volos	Volos	Yes
Greece	Pesticides Residue Laboratory of Regional Center of Plant Protection and Quality Control of Piraeus	Lykovrissi	Yes
Greece	Regional Center of Plant Protection and Quality Control of Iraklion. Laboratory of Pesticide Residue	Iraklion, Crete	Yes
Greece	Laboratory of Pesticide Residue Analyses, Regional Centre of Crop Protection & Quality Control of Ioannina	Ioannina	Yes
Greece	Regional Centre Of Plant Protection And Quality Control Thessaloniki	Thessaloniki	Yes
Greece	General Chemical State Laboratory	Athens	Yes
Hungary	National Food Chain Safety Office, Hodmezovasarhely Laboratory	Hodmezovasarhely	Yes
Hungary	National Food Chain Office, DPPSCA, Pesticide Residue Analytical Laboratory, Miskolc	Miskolc	Yes
Hungary	National Food Chain Office Directorat of Plant Protection, Soil Conservation and Agri-Environment Pesticide Residue Analitycal Laboratory of Szolnok	Szolnok	Yes
Hungary	NFCSO Pesticide Analytical Laboratory, Velence	Velence	Yes
Iceland	Matis ohf.	Reykjavík	Yes

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
India	National Referral Laboratory, ICAR-NRC for Grapes	Pune	Yes
Indonesia	ANGLER BioChemLab, PT	Surabaya	Yes
Ireland	The Pesticide Control Laboratory	Celbridge	Yes
Israel	Pesticide Residue Laboratory	Bet-Dagan	Yes
Italy	Istituto Zooprofilattico dell'Abruzzo e del Molise G.Caporale Teramo Italy	Teramo	Yes
Italy	APPA Bolzano-Laboratorio analisi acque e cromatografia	Bolzano	Yes
Italy	ARPA FVG Laboratorio Alimenti	Pordenone	Yes
Italy	Istituto Zooprofilattico Sperimentale della Sardegna	Sassari	Yes
Italy	Laboratorio Contaminanti Ambientali	Perugia	Yes
Italy	Arpalazio Sezione Di Latina	Rieti	Yes
Italy	APPA - Settore Laboratorio - Provincia Autonoma di Trento	Trento	Yes
Italy	ASL Milano - Laboratorio di Prevenzione	Milano	Yes
Italy	Laboratorio Tematico Fitofarmaci ARPA Emilia Romagna-Sezione Provinciale di Ferrara	Ferrara	Yes
Italy	ARPA Marche- Dip. Macerata	Macerata	Yes
Italy	Laboratorio Di Prevenzione - Agenzia Per La Tutela Della Salute Di Bergamo	Bergamo	Yes
Italy	Istituto Zooprofilattico Sperimentale Lombardia Emilia Romagna (IZSLER) - Laboratorio Pesticidi	Brescia	Yes
Italy	ARPA Valle d'Aosta	Saint-Christophe	Yes
Italy	ARPA LAZIO	Roma	Yes
Italy	Istituto Superiore di Sanità	Roma	Yes
Italy	A.R.P.A. Veneto Dip. Laboratori S.O. Verona	Verona	Yes
Italy	Laboratorio Di Sanita' Pubblica Azienda Usl Toscana Centro	Firenze	Yes
Italy	ARPAL - Dipartimento La Spezia - U.O. Laboratorio	La Spezia	Yes
Italy	IZSLT - Roma	Roma	Yes
Italy	Arpa Puglia - Polo Specializzazione Alimenti	Bari	Yes
Italy	IZS Sicilia Area Chimica e Tecnologie Alimentari	Palermo	Yes
Italy	Servizio Laboratorio Chimico ARPACAL	Cosenza	No
Kenya	SGS Kenya Limited Mombasa Laboratory	Mombasa	Yes
Latvia	Institute of Food Safety Animal Health and Environment BIOR	Riga	Yes
Lithuania	National Food Veterinary Risk Assessment Institute	Vilnius	Yes

ANNEX 2. List of laboratories that agreed to participate in EUPT-FV-18.

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Luxembourg	Laboratoire National de Santé - Alimentaire	Dudelange	Yes
Malta	Eurofins Dr. Specht Laboratorien GmbH	Hamburg	Yes
Norway	Norwegian Institute of Bioeconomy Research, Biotechnology and Plant Health division	Aas	Yes
Panama	Laboratorio de Residuos de Plaguicidas en Plantas y Productos Vegetales	Panama	Yes
Poland	Plant Protection Institute – National Research Institute Pesticide Residue Laboratory	Bialystok	Yes
Poland	Regional Experimental Station in Rzeszow, Institute of Plant Protection – National Research Institute	Rzeszow	Yes
Poland	Main Inspectorate of Plant Health and Seed Inspection, Central Laboratory	Torun	Yes
Poland	Wojewódzka Stacja Sanitarno-Epidemiologiczna w Łodzi	Łódź	Yes
Poland	Laboratory of Voivodship Sanitary-Epidemiological Station	Warsaw	Yes
Poland	Research Institute of Horticulture, Food Safety laboratory	Skierniewice	Yes
Poland	Institute of Plant Protection-National Research Institute Branch Sosnicowice	Sosnicowice	Yes
Poland	Wojewodzka Stacja Sanitarno-Epidemiologiczna w Opolu	Opole	Yes
Poland	Wojewodzka Stacja Sanitarno-Epidemiologiczna we Wroclawiu - Dzial Laboratoryjny	Wroclaw	Yes
Poland	UO-Technologia Laboratorium Grójec	Grójec	Yes
Poland	JS Hamilton Poland S.A.	Gdynia	Yes
Poland	SGS Sp. z o.o. Laboratorium Srodowiskowe	Pszczyna	Yes
Poland	Department of Pesticide Residue Research, Institute of Plant Protection	Poznan	Yes
Portugal	LRVSA-Laboratório Regional de Veterinária e Segurança Alimentar-Madeira	Funchal	Yes
Portugal	INIAV - UEISTSA - Laboratório de Residuos de Pesticidas - Oeiras	Oeiras	Yes
Romania	Regional Laboratory For Pesticide Residues Control In Plant And Plant Products Mures	Targu Mures	Yes
Romania	Laboratory for Pesticide Residues Control in Plants and Vegetables Products	Bucuresti	Yes
Romania	Sanitary veterinary and food safety	Iasi	Yes
Romania	Sanitary Veterinary and Food Safety Directorate	Bucharest	Yes
Serbia	SP Laboratorija	Becej	Yes
Serbia	Center for Food Analysis	Belgrade	Yes
Slovakia	Veterinary and Food Institute in Bratislava	Bratislava	Yes
Slovakia	National Reference Centre for Pesticide Residues, Public Health Authority of the Slovak Republic	Bratislava	Yes
Slovenia	National Laboratory Of Health, Environment And Food	Ljubljana	Yes
Slovenia	Kmetijski inštitut Slovenije (Agricultural Institute of Slovenia)	Ljubljana	No

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Slovenia	National laboratory for health, envoronment and food	Maribor	Yes
Spain	Laboratorio Agroalimentario de Granada	Atarfe, Granada	Yes
Spain	Laboratorio Regional de la CCAA de La Rioja	Logroño	Yes
Spain	Laboratorio de Producción y Sanidad Vegetal de Almería	La Mojonera, Almería	Yes
Spain	CNTA	San Adrián, Navarra	Yes
Spain	Centro Nacional De Alimentación	Majadahonda, Madrid	Yes
Spain	NASERTIC	Villava	Yes
Spain	Laboratorio Del Servicio De Inspección Soivre De Valencia	Valencia	Yes
Spain	Laboratorio Agroalimentario De Extremadura	Cáceres	Yes
Spain	Laboratorio Agrario Regional. Junta de Castilla y Léon	Burgos	Yes
Spain	AINIA	Paterna	Yes
Spain	Laboratorio Kudam, S.L	Pilar de la Horadada, Alicante	Yes
Spain	Laboratorio De Produccion Y Sanidad Vegetal De Jaen	Mengibar, Jaén	Yes
Spain	Laboratorio Agroambiental de Zaragoza (Gobierno de Aragón)	Zaragoza	Yes
Spain	Laboratorio De Salud Publica De Almeria	Almería	Yes
Spain	Laboratorio De Salud Pública De Badajoz	Badajoz	Yes
Spain	Laboratorio De Salud Publica- Madrid Salud	Madrid	Yes
Spain	Laboratorios Ecosur, S.A.	Lorquí, Murcia	Yes
Spain	Laboratorio Agroalimentario Y De Sanidad Animal De Murcia	El Palmar, Murcia	Yes
Spain	Laboratorio de Producción y Sanidad Vegetal de Huelva	Huelva	Yes
Spain	Laboratorio Arbitral Agroalimentario	Madrid	Yes
Spain	Laboratori Agroalimentari	Cabrils	Yes
Spain	Analytica Alimentaria GmbH, sucursal en España	Almería	Yes
Spain	Laboratory of Barcelona Public Health Agency	Barcelona	Yes
Spain	Laboratorio Agroalimentario de Valencia	Burjassot, Valencia	Yes
Spain	Laboratori de Salut Pública de Palma - Conselleria de Salut	Palma	Yes
Spain	Laboratorio agroalimentario y ambiental de Castilla la mancha (LARAGA)	Toledo	Yes
spain	Laboratorio de la Direccion Provincial de la Consejeria de Sanidad	Cuenca	Yes

ANNEX 2. List of laboratories that agreed to participate in EUPT-FV-18.

COUNTRY	LABORATORY NAME	CITY	REPORTED RESULTS
Spain	Agricultural and Phythopathological Laboratory of Galicia	Abegondo, A Coruña	Yes
Spain	Laboratorio del SOIVRE. Dirección Provincial de Comercio	Almería	Yes
Spain	Laboratorio Químico Microbiológico, S.A	Murcia	Yes
Spain	Labs & Technological Services, AGQ	Burguillos	Yes
Spain	Laboratorio De Sanidad Vegetal. Consejería De Desarrollo Rural Y Recursos Naturales	Oviedo	No
Spain	Instituto Tecnológico De Canarias, S. A.- Laboratorio De Residuos-Departamento De Análisis Ambiental	Agüimes	Yes
Sweden	Eurofins Food & Feed Testing Sweden AB	Lidköping	Yes
Sweden	Swedish National Food Agency, Division of Science, Department of Chemistry	Uppsala	Yes
Switzerland	Kantonales Laboratorium Bern	Bern	Yes
Switzerland	Amt für Verbraucherschutz Aargau (Cantonal Office of Consumer Protection Aargau)	Aarau	Yes
Switzerland	Kantonales Labor Zürich	Zürich	Yes
Thailand	Central Laboratory (Thailand) Co., Ltd. Bangkok branch	Bangkok	Yes
The Netherlands	NVWA - Netherlands Food and Consumer Product Safety Authority	Wageningen	Yes
Turkey	Private MSM Food Control Laboratory	Mersin	Yes
United Kingdom	Science and Advice for Scottish Agriculture (SASA)	Edinburgh	Yes
United Kingdom	Scientific Analysis Laboratories Ltd	Bar Hill	Yes
United Kingdom	Fera Science Ltd	York	Yes
United Kingdom	Eurofins Food Testing UK Ltd	Wolverhampton	Yes
United Kingdom	LGC Teddington	Teddington	Yes